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Brewster, Jr. et al.

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[54] **METHOD OF IN-LINE ADDRESSING FOR MODULAR FOLDER INSERTERS**

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 Conn.

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[51] Int. Cl.⁶ **G06F 17/00; B65H 45/00**

[52] U.S. Cl. **364/478.08; 364/478.14;**
364/478.15; 705/408; 270/52.09

[58] Field of Search **364/478.08, 464.02,**
364/464.12, 464.17, 464.22, 478.14, 146,
478.15; 53/411, 415, 416; 395/114, 117;
705/403, 406-410; 27/52.03, 52.09

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[57] ABSTRACT

The invention is a method of in-line addressing, for both matched and non-matched mail, comprising a number of steps which begin with the generation of document data in a data processing system and then transmitting that document data to a document printer. The document data is printed, at the document printer, onto a substrate which is subsequently fed to an accumulator. Additionally, address data is generated in the data processing system and transmitted to an envelope printer where the address data is printed to one or more envelopes. The envelope printer is capable of printing a return address, a destination address, and a bar code in respect of the destination address upon the envelope. The address data can be merged with graphics data so that the envelope printer is further capable of printing graphics on the envelope. Once at the accumulator, predetermined batches of one or more sheets of the printed substrate are fed into a sheet folder. The sheet folder folds the predetermined batches and then subsequently feeds the folded batches to the insert feeder. The folded batches are inserted into the printed envelopes to form a mail piece which is then transported to a mail processing apparatus; in an alternative embodiment, the envelopes can be printed upon after stuffing. Taken together, the sheet feeder, accumulator, sheet folder, and insert feeder comprise a folder/insert system. The envelope throughput is timed to match batch throughput of the folder/insert system.

14 Claims, 8 Drawing Sheets

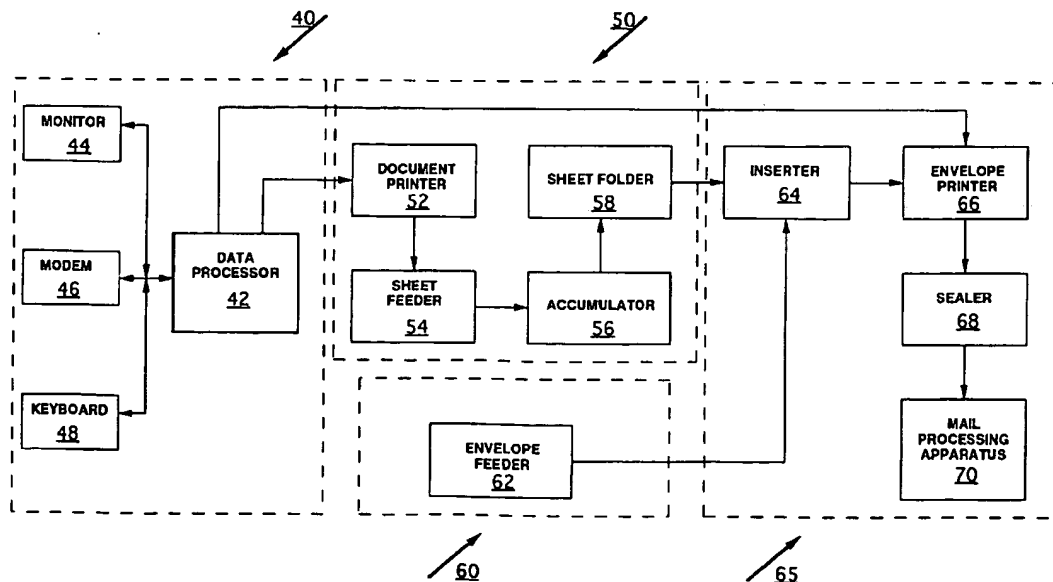


FIG. 1A

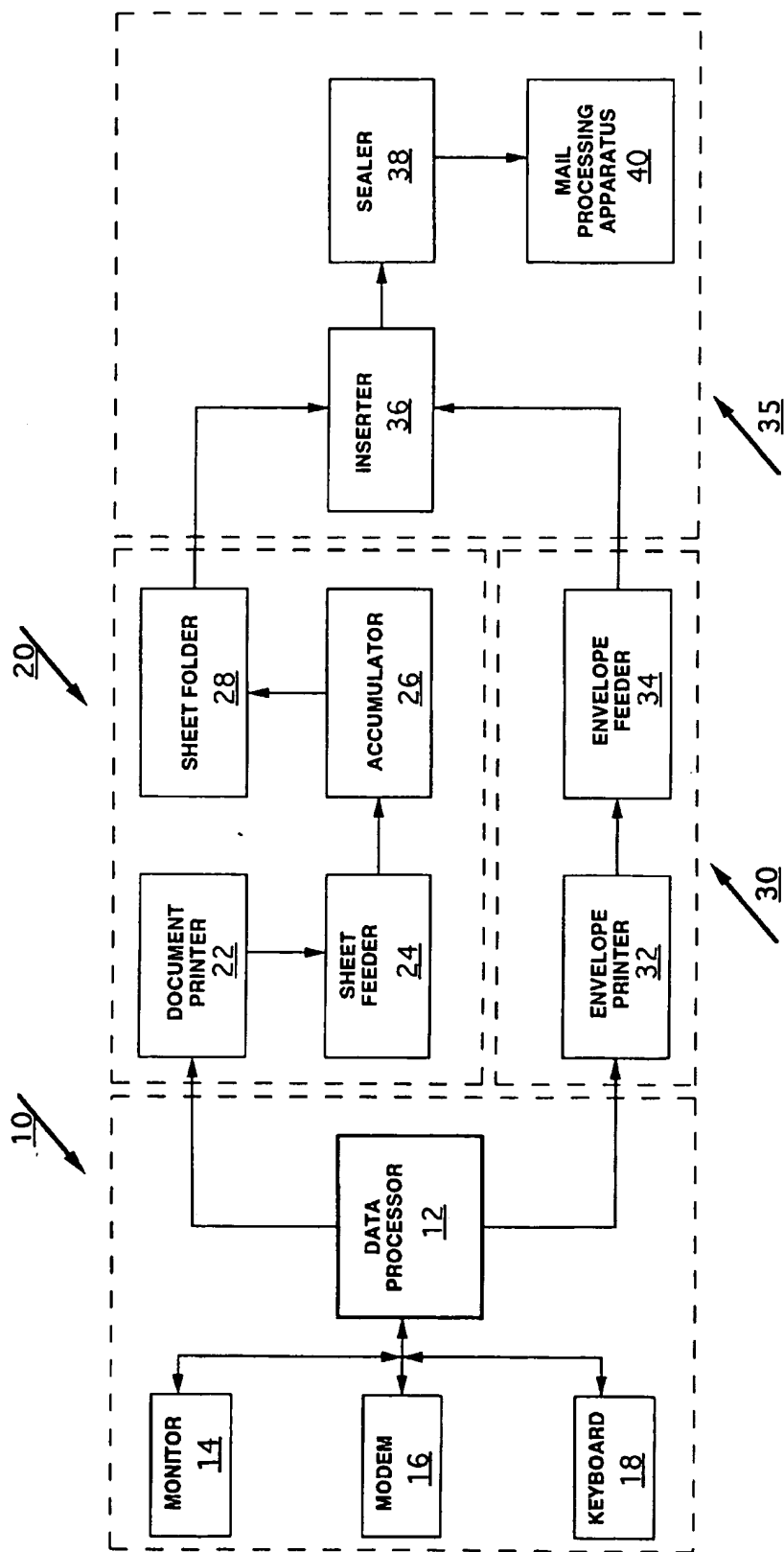


FIG. 1B

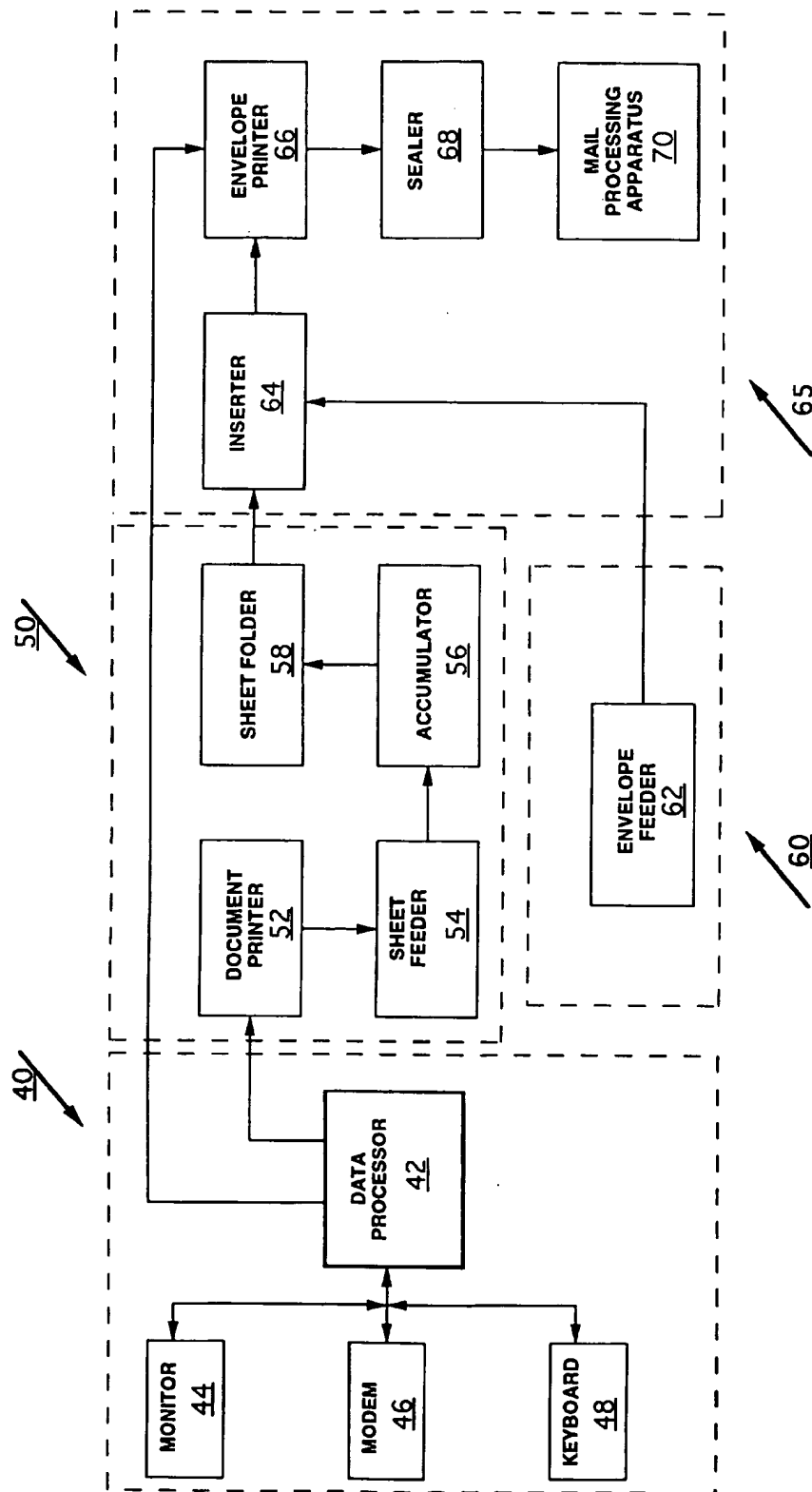


FIG. 2A

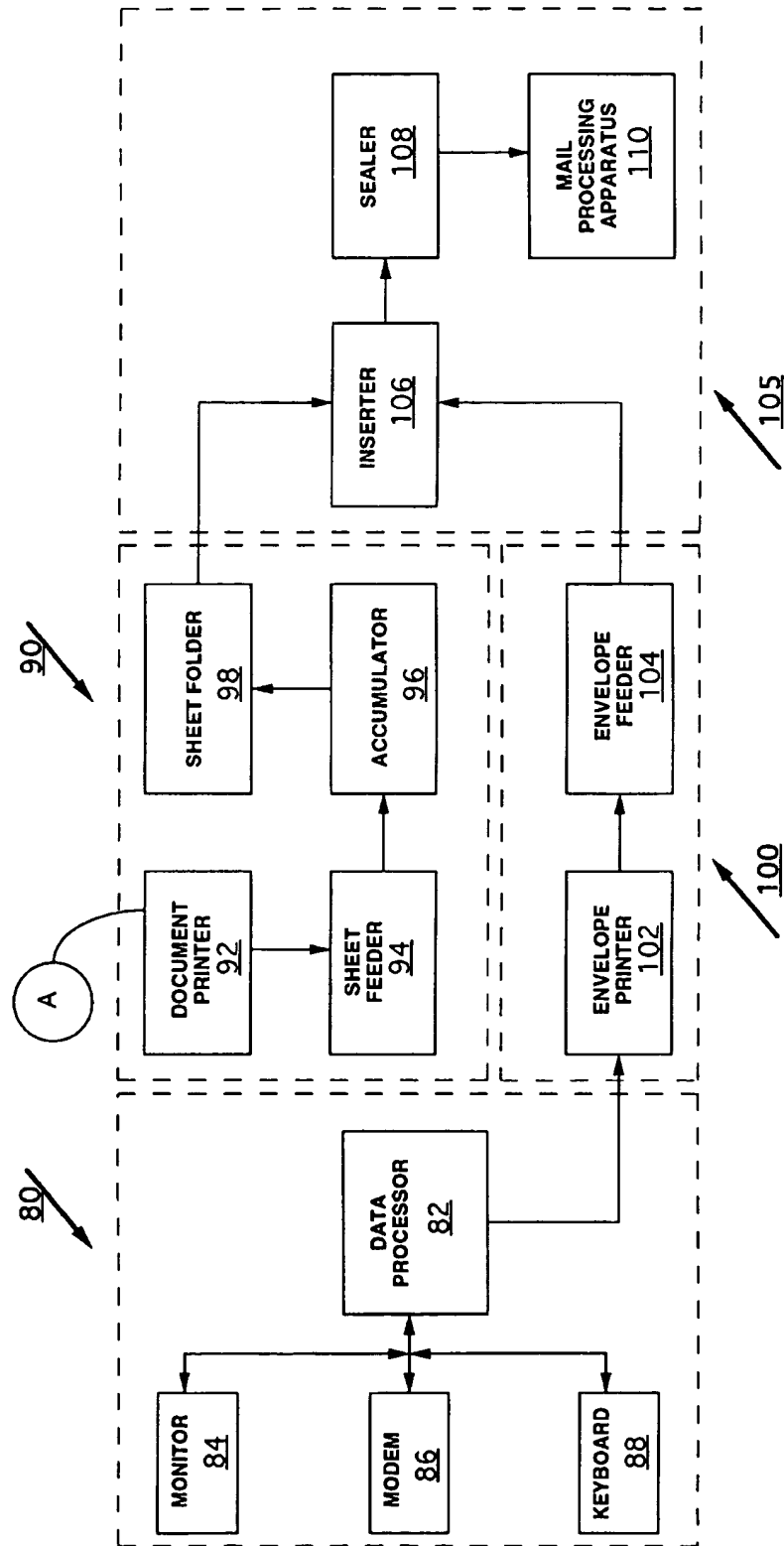


FIG. 2B

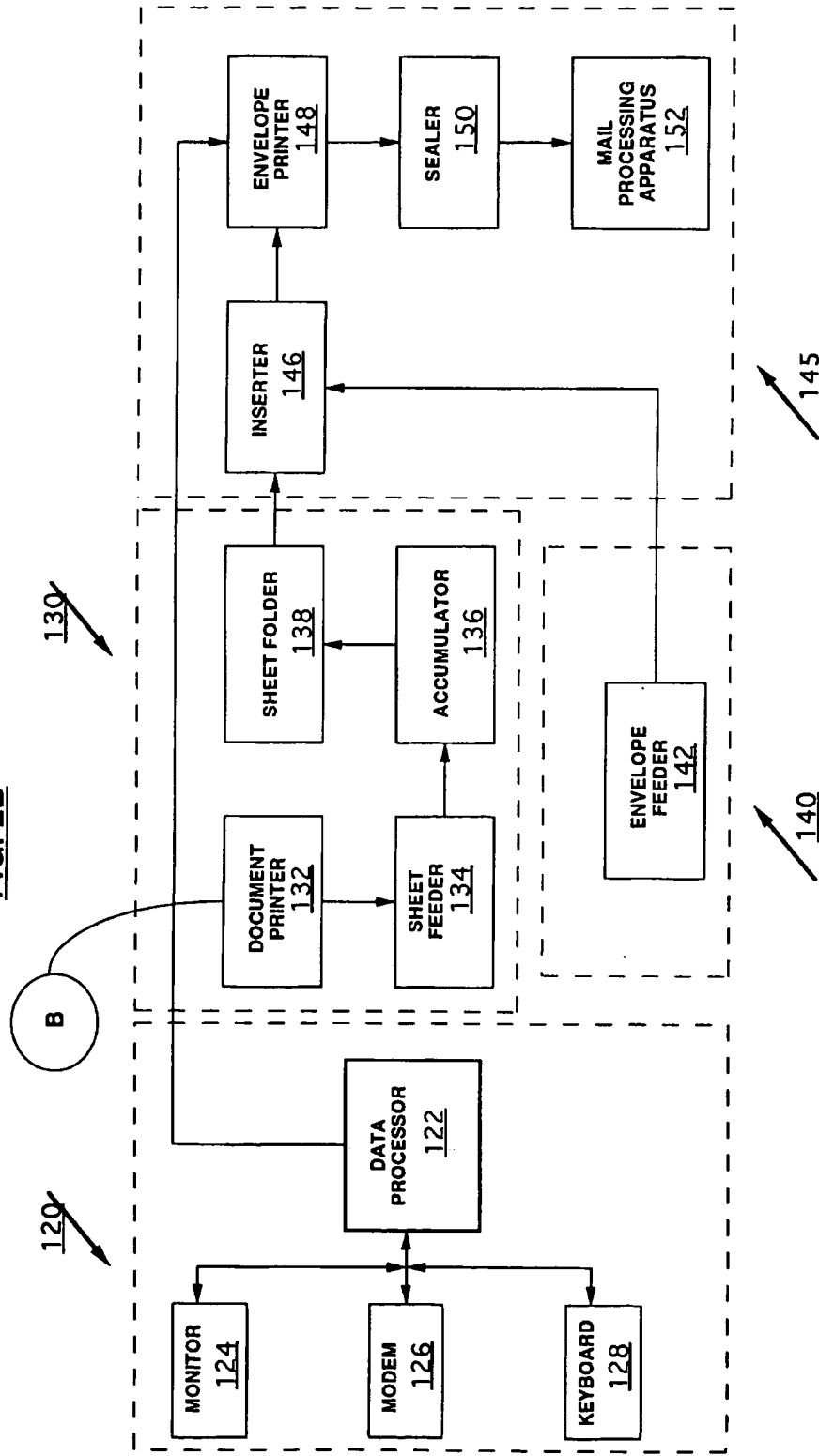


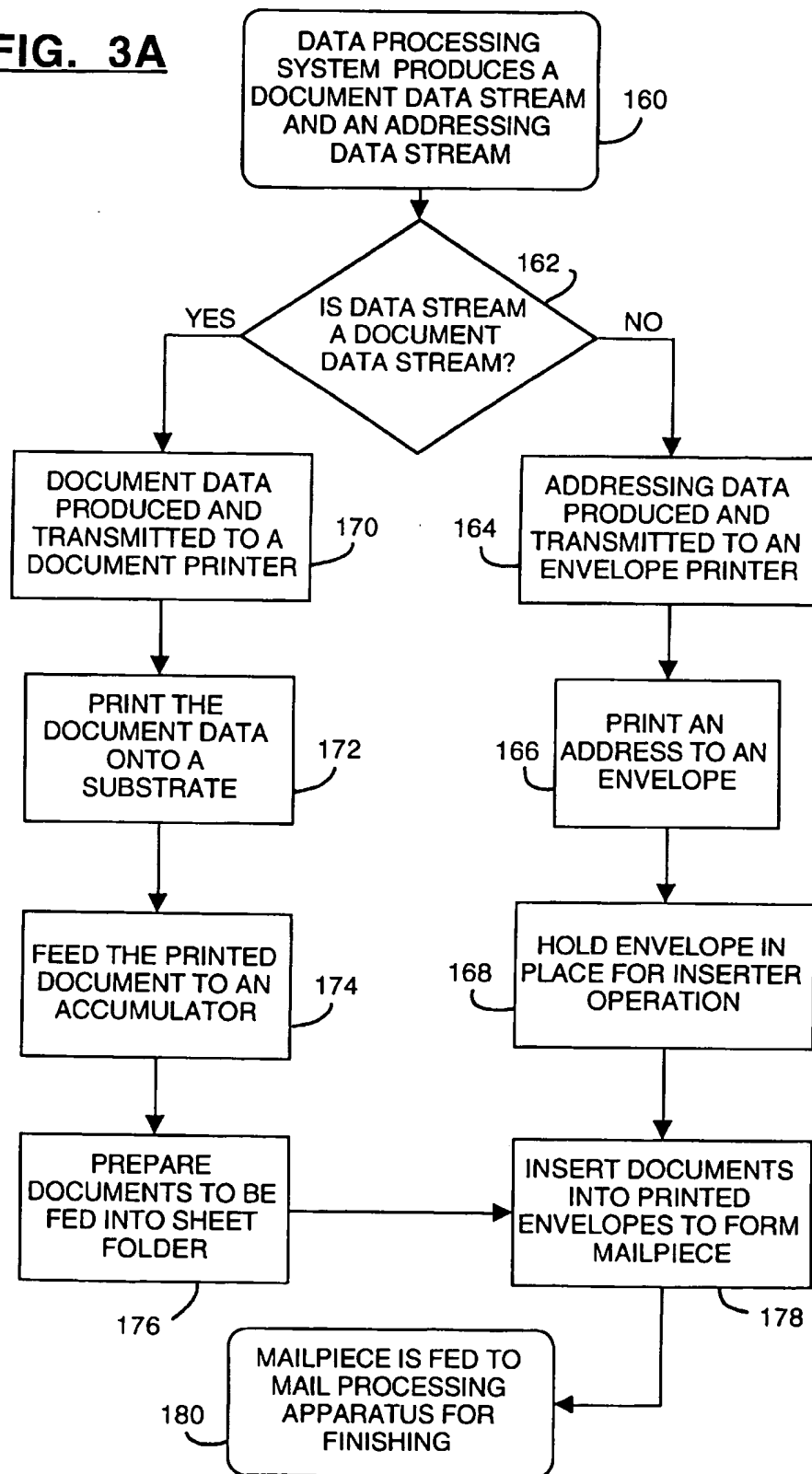
FIG. 3A

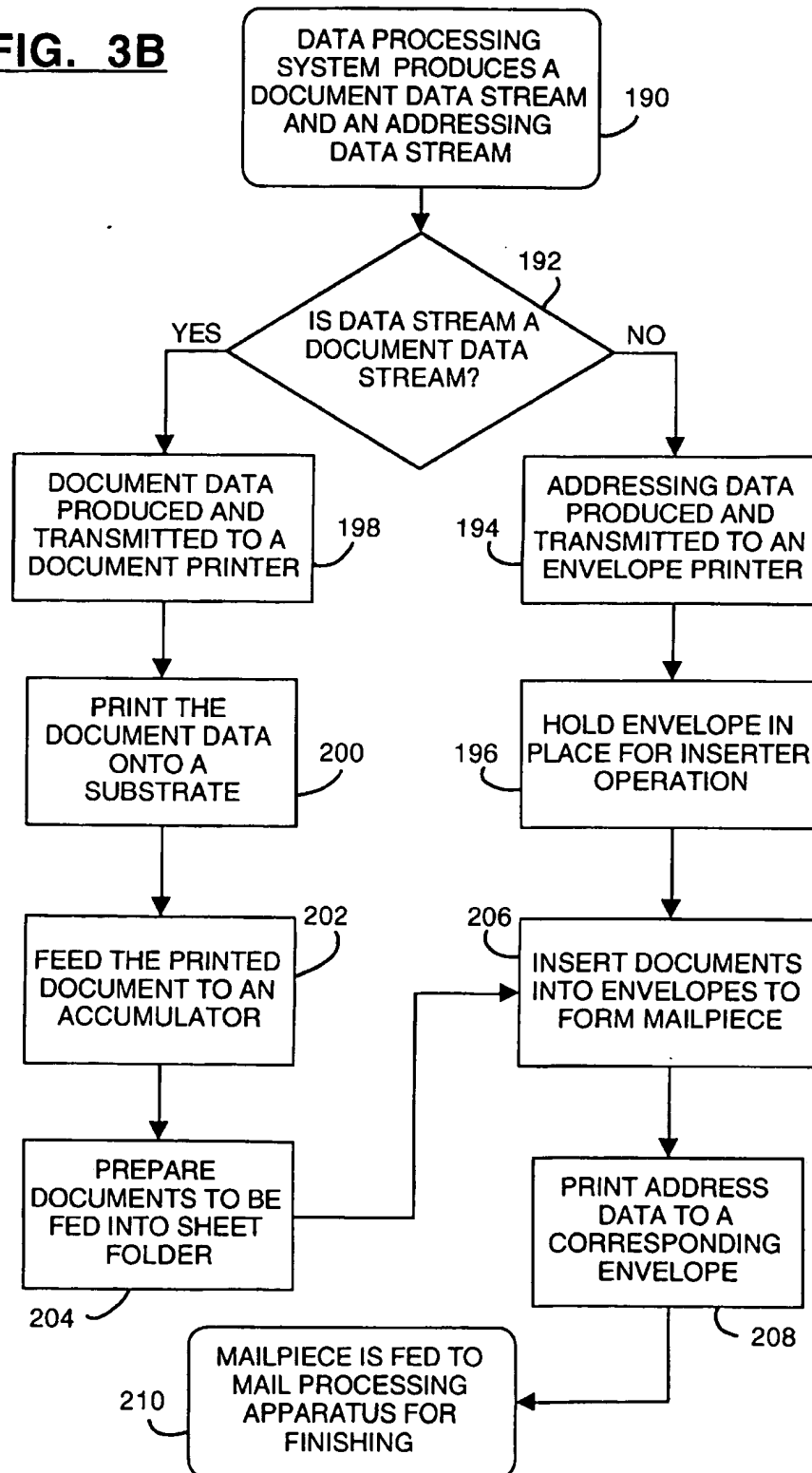
FIG. 3B

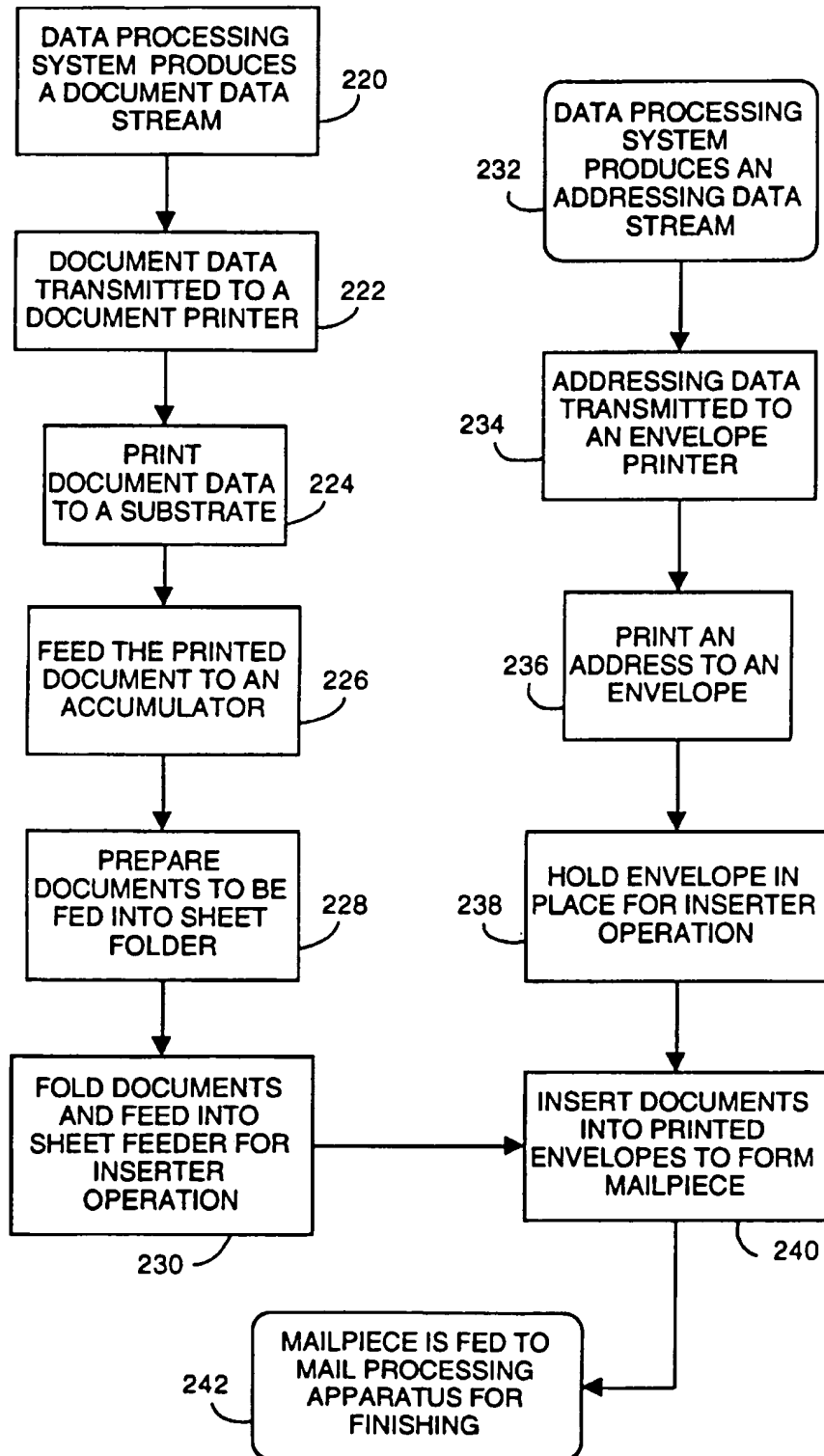
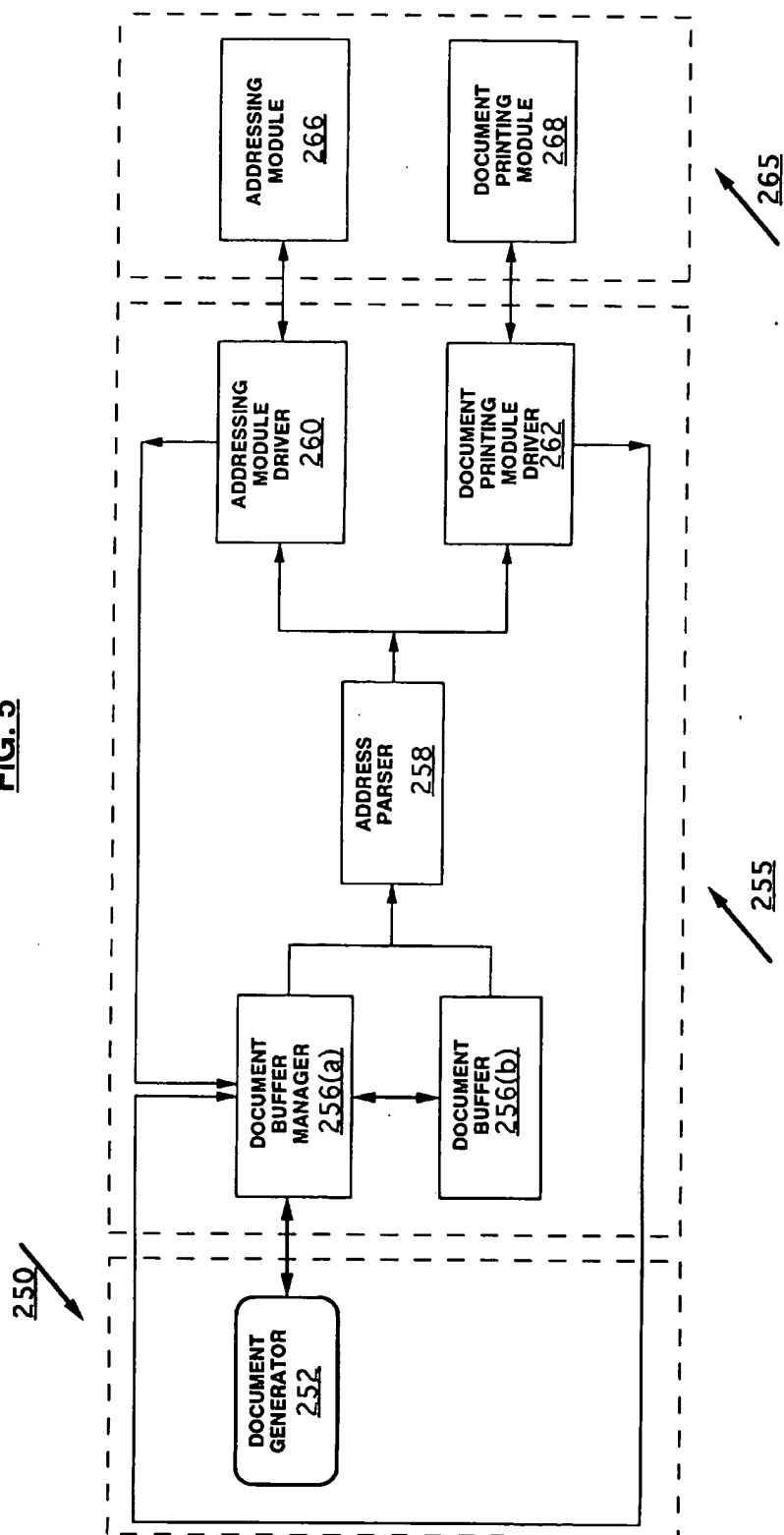
FIG. 4

FIG. 5



METHOD OF IN-LINE ADDRESSING FOR MODULAR FOLDER INSERTERS

BACKGROUND OF THE INVENTION

This invention relates to the field of in-line processing of a mailpiece. More particularly, it relates to the use of a plurality of printers in both a matched mail and a non-matched mail environment. A matched mail environment is one in which the address printed on the document matches the address to be printed on the document's corresponding envelope. In the matched mail environment, it is desirable that two separate data streams, each with its own distinct path, emanate from the same data source and eventually re-unite at some combined operation (usually the insertion step). A non-matched mail environment, on the other hand, is one in which the document does not have a unique address which corresponds to the address to be printed upon the document's corresponding envelope. In the non-matched mail environment, two separate data streams, each with its own distinct path, emanate from two different data sources and eventually unite at some combined operation.

In general, in-line processing takes component parts of unique functionality and places the parts in a line for the purpose of getting the most out of each functional area placed in-line. In-line addressing is a method of producing a finished mailpiece by the use of a series of modules, each module with its own unique function. By utilizing two or more printers, working essentially simultaneously, the in-line functionality of the overall system is enhanced by making the best use of the throughput of the printers rather than alternating the print responsibilities of a single printer within the system. Additionally, the in-line functionality for matched mail is further increased because there is an increased likelihood of matching a printed document to its corresponding printed envelope.

How the various modules of an in-line system inter-relate, so that each can communicate with the other so as to properly time the insertion of printed documents into that document's corresponding printed envelope is disclosed in such patents as U.S. Pat. No. 4,992,950 for a MULTIPLE PROCESSING STATION MESSAGE COMMUNICATION, issued Feb. 12, 1991 to Francisco.

Interactive functionality between mailer and addressee of modular systems has been addressed by such patents as U.S. Pat. No. 4,800,504 for an INTERACTIVE OUTGOING AND INCOMING MAILPIECE PROCESSING SYSTEM, issued Jan. 24, 1989 to Durst, Jr. et al.

But, a disadvantage of the prior art has been the concentration of functionality on a single data stream within the in-line flow. By splitting a data stream intentionally as in the case of matched mail or, by necessity as in the case of non-matched mail, a plurality of printers can be used to print a corresponding data stream. Thus, a distinct advantage is gained in the production of a mailpiece by the creation of a plurality of data streams wherein each data stream is directed to a specialized printer capable of printing that data in the best mode possible.

Therefore, an object of the present invention is to improve the throughput of in-line addressing systems by providing a means of producing a plurality of data streams, each of which can utilize a separate print means, and then combine the data streams within the capability of the in-line modules. Another object of the present invention is to provide the ability to use specialized addressing printers that can print, among other data, Postnet barcodes and/or graphics to an envelope within an in-line addressing system without

degrading the functionality of the system's ability to print document data to cut sheets.

SUMMARY OF THE INVENTION

According to the invention, the object is achieved and the disadvantages of the prior art are overcome by a method of in-line addressing for matched and non-matched mail comprising a sequence of steps.

The method steps begin with the generation of document data in a data processing system and then transmitting that document data to a document printer. The document data is printed, at the document printer, onto a substrate which is subsequently fed via a sheet feeder to an accumulator.

Once at the accumulator, predetermined batches of one or more sheets of the printed substrate are fed into a sheet folder. The sheet folder folds the predetermined batches and then subsequently feeds the folded batches to the inserter. The folded batches are inserted into the printed envelopes to form a stuffed envelope which is then transported to a mail processing apparatus.

Additionally, address data is generated in the data processing system and transmitted to an envelope printer where the address data is printed to one or more envelopes. The envelope printer is capable of printing a return address, a destination address, and a bar code in respect of the destination address upon the envelope. The address data can be merged with graphics data so that the envelope printer is further capable of printing graphics on the envelope. The graphics could be a part of the address data or could be downloaded into RAM memory prior to receipt of the address data. The printed envelopes are fed to an inserter where one or more sheets of printed substrate are inserted therein. In an alternative embodiment of the invention, the envelopes are printed subsequent to having the printed document inserted therein.

Taken together, the sheet feeder, accumulator, sheet folder, and insert feeder comprise a folder/inserter system of variable throughput potential. The envelope throughput of the envelope printer is timed to match batch throughput of the predetermined batch in the folder/inserter system.

The folder/inserter system monitors passage of the substrate as the substrate is fed through the folder/inserter system; and, if said substrate is determined to be jammed or out of alignment thus causing a feed path error, then the folder/inserter system transmits a first signal to a system operator wherein the first signal is indicative of the feed path error; and, the folder/inserter system transmits a second signal to the data processing system wherein the second signal is indicative of the feed path error and wherein the second signal is an instruction to the data processing system to stop transmitting document data to the document printer and to stop transmitting address data to the envelope printer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a block diagram of the apparatus that can be used in a matched mail embodiment of the present invention where the envelope printer is in parallel to the document printer.

FIG. 1B is a block diagram of the apparatus that can be used in a matched mail embodiment of the present invention where the envelope printer is in-line with the document printer.

FIG. 2A is a block diagram of the apparatus that can be used in a non-matched mail embodiment of the present invention where the envelope printer is in parallel to the document printer.

FIG. 2B is a block diagram of the apparatus that can be used in a non-matched mail embodiment of the present invention where the envelope printer is in-line with the document printer.

FIG. 3A is a flowchart of the method embodied in a matched mail environment.

FIG. 3B is a flowchart of an alternative embodiment of the method of the subject invention in a matched mail environment.

FIG. 4 is a flowchart of the method embodied in a non-matched mail environment.

FIG. 5 is a high level flowchart of the print manager program utilized in both the matched mail and non-matched mail embodiments of the method.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning to FIG. 1A, there are shown in block form, four subsystems (10, 20, 30 and 35) that together form a system that can be used in a matched mail embodiment of the present invention. A matched mail environment is one in which the address to be printed upon the document matches the address to be printed upon the document's corresponding envelope. In the matched mail environment it is desirable that two separate data streams, each with its own distinct path, emanate from the same data source and eventually re-unite at some combined operation.

Subsystem 10 comprises the elements which initiate and control the two data streams. Subsystem 10 is comprised of data processor 12 which stores the programs and applications that initiate addressing data for a first data stream and document data for a second data stream. Data processor 12 is operatively connected to: monitor 14 for viewing of the application's operator interface; modem 16 for accepting data from environments external to the system; and, keyboard 18 for local entry of data to be used by data processor 12.

Subsystem 20 comprises the elements which support the document data stream. Subsystem 20 is comprised of: document printer 22 which prints document data, obtained from data processor 12, to a substrate such as a standard cut sheet; sheet feeder 24 which directs the printed substrate or sheet to an accumulator; accumulator 26 which collects the individual sheets to be folded together by a sheet folder; and, sheet folder 28 which folds together the individual sheets to be inserted in each envelope.

Subsystem 30 comprises the elements which support the addressing data stream. Subsystem 30 is comprised of envelope printer 32 which prints addressing data (the addressing data may include Postnet barcoding and graphics data) obtained from data processor 12, to a substrate such as an envelope; and, envelope feeder 34 which directs the printed envelope to an inserter.

Subsystem 35, which comprises mailpiece processing apparatus, reunites the divided data streams by inserting the folded and addressed sheets into their corresponding addressed envelopes. The elements of subsystem 35 include inserter 36 which places the folded sheets coming from sheet folder 28 into the envelopes coming from envelope feeder 34. The stuffed envelopes are then passed from inserter 36 to sealer 38 where the envelopes are sealed before being finished by mail processing apparatus 40. The mail processing apparatus can be diverse in that the apparatus might include: another inserter (if the sealed envelope was being further inserted into another envelope); a mailing scale; a

postage meter; and, tabbing devices among other possible elements. A key element of the overall system is the timing of the two data streams so as to properly match the printed document with its respective printed envelope.

Turning to FIG. 1B, there are shown in block form, four subsystems (40, 50, 60 and 65) that together form a system that can be used in an alternative matched mail embodiment of the present invention. As with the embodiment discussed with respect to FIG. 1A, there are two separate data streams emanating from a single data source; however, the data streams are combined at the envelope printer after insertion has taken place.

Subsystem 40 comprises the elements which initiate and control the two data streams. Subsystem 40 is comprised of data processor 42 which stores the programs and applications that initiate addressing data for a first data stream and document data for a second data stream. Data processor 42 is operatively connected to: monitor 44 for viewing of the application's operator interface; modem 46 for accepting data from environments external to the system; and, keyboard 48 for entering data to be used by data processor 42.

Subsystem 50 comprises the elements which support the document data stream. Subsystem 50 is comprised of: document printer 52 which prints document data, obtained from data processor 42, to a substrate such as a standard cut sheet; sheet feeder 54 which directs the printed substrate or sheet to an accumulator; accumulator 56 which collects the individual sheets to be folded together by a sheet folder; and, sheet folder 58 which folds together the individual sheets to be inserted in each envelope.

Subsystem 60 comprises the element which feeds the envelopes to an inserter. Subsystem 60 is comprised of envelope feeder 62 which feeds envelopes to an inserter where the sheets folded by sheet folder 58 are to be inserted into the envelopes.

Subsystem 65, which comprises mailpiece processing apparatus, reunites the divided data streams when the system prints an address upon envelopes coming from an inserter that has placed the folded sheets coming from sheet folder 58 into the envelopes being fed from envelope feeder 62. The elements of this subsystem include inserter 64 which places the folded sheets coming from sheet folder 58 into the envelopes coming from envelope feeder 62. The stuffed envelopes are fed from inserter 64 to envelope printer 66 where an address is printed upon the envelopes by envelope printer 66; and in so doing, the two separate data streams are reunited. The printed envelopes are sealed by sealer 68 before being finished by mail processing apparatus 70. The mail processing apparatus can be diverse in that the apparatus might include: another inserter (if the sealed envelope was being further inserted into another envelope); a mailing scale; a postage meter; and, tabbing devices among other possible elements. A key element of the overall system is the timing of the two data streams so as to always have available an envelope for a folded document, and an address for a stuffed envelope.

Turning to FIG. 2A, there are shown four subsystems (80, 90, 100 and 105) that together form a system that can be used in a non-matched mail embodiment of the present invention. A non-matched mail environment is one in which the document does not have a unique address which corresponds to the address to be printed upon the document's corresponding envelope. In the non-matched mail environment, as with the matched mail environment, there are two separate data streams, each with its own distinct path. The environments differ in that the data streams

emanate from two different data sources and eventually unite at some combined operation.

Subsystem 80 comprises the elements which initiate and control the addressing data stream. Subsystem 80 is comprised of data processor 82 which stores the programs and applications that initiate addressing data for a first data stream. Data processor 82 is operatively connected to: monitor 84 for viewing of the application's operator interface; modem 86 for accepting or transmitting data from or to environments external to the system; and, keyboard 88 for entering data to be used by data processor 82.

Subsystem 90 comprises the elements which support the document data stream. Subsystem 90 is comprised of: document printer 92 which receives document data from source A which may be external to data processor 82 and can be another data processor, a download from modem 86, or a download from some other document data generating or transmitting means which can direct the document data to document printer 92 which prints the document data to a substrate such as a standard cut sheet; sheet feeder 94 which directs the printed substrate or sheet to an accumulator; accumulator 96 which collects the individual sheets to be folded together by a sheet folder; and, sheet folder 98 which folds together the individual sheets to be inserted into each envelope by an inserter.

Subsystem 100 comprises the elements which support the addressing data stream. Subsystem 100 is comprised of envelope printer 102 which prints addressing data (which may include postal net barcoding and graphics data), obtained from data processor 82, to a substrate such as an envelope; and, envelope feeder 104 which directs the printed envelope to an inserter.

Subsystem 105, which comprises mail processing apparatus, reunites the divided data streams by inserting the folded sheets into their corresponding addressed envelopes. The elements of this subsystem can be diverse in that they might include: an inserter (though manual insertion could be utilized here); a mailing scale; a postage meter; and, tabbing devices among other possible elements. Again, a key element of the overall system is the timing of the two data streams so as to properly combine a printed document with an addressed envelope.

Turning to FIG. 2B, there are shown four subsystems (120, 130, 140 and 145) that together form a system that can be used in a non-matched mail embodiment of the present invention. A non-matched mail environment is one in which the document does not have a unique address which corresponds to the address to be printed upon the document's corresponding envelope. In the non-matched mail environment, as with the matched mail environment, there are two separate data streams, each with its own distinct path. The environments differ in that the data streams emanate from two different data sources and eventually unite at some combined operation.

Subsystem 120 comprises the elements which initiate and control the addressing data stream. Subsystem 120 is comprised of data processor 122 which stores the programs and applications that initiate addressing data for a first data stream. Data processor 122 is operatively connected to: monitor 124 for viewing of the application's operator interface; modem 126 for accepting or transmitting data from or to environments external to the system; and, keyboard 128 for entering data to be used by data processor 122.

Subsystem 130 comprises the elements which support the document data stream. Subsystem 130 is comprised of: document printer 132 which receives document data from

source B which may be external to data processor 122 and can be another data processor, a download from modem 126, or a download from some other document data generating or transmitting means which can direct the document data to document printer 132 which prints the document data to a substrate such as a standard cut sheet; sheet feeder 134 which directs the printed substrate or sheet to an accumulator; accumulator 136 which collects the individual sheets to be folded together by a sheet folder; and, sheet folder 138 which folds together the individual sheets to be inserted in each envelope.

Subsystem 140 comprises the element which feeds the envelopes to an inserter. Subsystem 140 is comprised of envelope feeder 142 which feeds envelopes to an inserter where the sheets folded by sheet folder 138 are to be inserted into the envelopes.

Subsystem 145, which comprises mailpiece processing apparatus, reunites the divided data streams when the system prints an address upon envelopes coming from an inserter that has placed the folded sheets coming from sheet folder 138 into the envelopes being fed from envelope feeder 142. The elements of this subsystem include inserter 146 which places the folded sheets coming from sheet folder 138 into the envelopes coming from envelope feeder 142. The stuffed envelopes are fed from inserter 146 to envelope printer 148 where an address is printed upon the envelopes by envelope printer 148; and in so doing, the two separate data streams are reunited. The printed envelopes are sealed by sealer 150 before being finished by mail processing apparatus 152. The mail processing apparatus can be diverse in that the apparatus might include: another inserter (if the sealed envelope was being further inserted into another envelope); a mailing scale; a postage meter; and, tabbing devices among other possible elements. A key element of the overall system is the timing of the two data streams so as to always have available an envelope for a folded document, and an address for a stuffed envelope.

Turning to FIG. 3A, there is shown a flowchart of the method of in-line addressing for a matched mail environment. The method begins at step 160 where a data processing system produces a document data stream and an addressing data stream. The data processing system may be dedicated to a mailing system or may contain a variety of application programs and their respective data bases and external environment interfaces. From step 160, the method advances to a query at step 162.

At step 162, the method queries as to whether or not the data stream produced is a document data stream. If the response to the query is "YES," then the method follows the document data stream by advancing to step 170; otherwise, if the response to the query at step 162 is "NO," then the method advances along the addressing data stream to step 164.

At step 164, the addressing data is transmitted to an envelope printer before the method then advances to step 166. The address data is printed to one or more envelopes at step 166. The address data may include: an address with zip code, zip+4, or delivery point coding; a Postnet bar code; return address data; and, graphics data. The address data printed to the envelope will be the same address data contained within the address field of the document data to be printed at step 172. From step 166, the method advances to step 168.

At step 168, the method holds the printed upon envelope in place for a subsequent inserter operation to be performed at step 178.

Returning to step 170, the document data is transmitted to a document printer before the method then advances to step 172. The document data is printed to one or more cut sheets or similar substrate type (hereinafter referred to as "cut sheets") at step 172. Any address data printed to the cut sheet in the address field will be the same address data contained within the address data to be printed at step 166. From step 172, the method advances to step 174 where each printed upon cut sheet is fed to an accumulator which holds the printed upon cut sheets for subsequent feeding to a sheet folder at step 176. Once the printed upon cut sheets are folded at step 176, the method advances to step 178.

At step 178, the folded sheets are inserted into the printed upon envelopes thus combining the two data streams into a single mailpiece. From step 178, the method advances to step 180 where the mailpiece is fed to mail processing apparatus for finishing. A key element of the overall system is the timing of the two data streams so as to properly match the printed document with its respective printed envelope for insertion at this step.

Turning to FIG. 3B, there is shown a flowchart of an alternative embodiment of the subject invention for a matched mail environment wherein the envelope printer prints to the envelope after the printed cut sheets have been inserted into the envelope. The method begins with step 190 where a data processing system produces a document data stream and an addressing data stream. The data processing system may be dedicated to a mailing system or may contain a variety of application programs and their respective data bases and external environment interfaces. From step 190, the method advances to a query at step 192.

At step 192, the method queries as to whether or not the data stream produced is a document data stream. If the response to the query is "YES," then the method follows the document data stream by advancing to step 198; otherwise, if the response to the query at step 192 is "NO," then the method advances along the addressing data stream to step 194.

At step 194, the addressing data is transmitted to an envelope printer where the data is stored until step 208. From step 194, the method then advances to step 196. At step 196, the method holds an envelope in place for a subsequent inserter operation to be performed at step 206.

Returning to step 198, the document data is transmitted to a document printer before the method then advances to step 200. The document data is printed to one or more cut sheets or similar substrate type (hereinafter referred to as "cut sheets") at step 200. Any address data printed to the cut sheet in the address field will be the same address data contained within the address data to be printed at step 208. From step 200, the method advances to step 202 where each printed upon cut sheet is fed to an accumulator which holds the printed upon cut sheets for subsequent feeding to a sheet folder at step 204. Once the printed upon cut sheets are folded at step 204, the method advances to step 206.

At step 206, the folded sheets are inserted into the envelopes previously held in place at step 196. From step 206, the method advances to step 208 where the address data is printed to one or more envelopes, thus combining the two data streams into one mailpiece. The address data may include: an address with zip code, zip+4, or delivery point zip coding; a postal net bar code; return address data; and, graphics data. The address data printed to the envelope will be the same address data contained within the address field of the document data to be printed at step 200. From step 208, the method advances to step 210 where the mailpiece

is fed to mail processing apparatus for finishing. A key element of the overall system is the timing of the two data streams so as to properly match the printed document with its respective printed envelope for insertion at this step.

Turning to FIG. 4, there is shown a flowchart of the method of in-line addressing for a non-matched mail environment. The method begins with steps 200 and 232 which may begin essentially simultaneously or may begin at different times.

At step 220, document data is produced at a data processing system. The system may be dedicated to a mailing system or may contain a variety of application programs and their respective data bases and external environment interfaces. Once the data stream is produced, the document data is transmitted at step 222 to a document printer before the method then advances to step 224. The document data is printed to one or more cut sheets or similar substrate type (hereinafter referred to as "cut sheets") at step 224. From step 224, the method advances to step 226 where each printed cut sheet is fed to an accumulator which holds the printed cut sheets for subsequent feeding, at step 228, to a sheet folder for folding at step 230. Once the printed cut sheets are folded at step 230, the method advances to step 240.

Returning to step 232, addressing data is produced at a data processing system. The system may be dedicated to a mailing system or may contain a variety of application programs and their respective data bases and external environment interfaces. Once produced, the addressing data is transmitted, at step 234, to an envelope printer before the method then advances to step 236. At step 236, the address data is printed to one or more envelopes or similar substrate. The address data may include: an address with zip code, zip+4, or delivery point coding; a Postnet bar code; return address data; and, graphics data. From step 236, the method advances to step 238. At step 238, the method holds the printed envelope in place for a subsequent inserter operation to be performed at step 240.

At step 240, the folded sheets are inserted into the printed envelopes, thus combining the two data streams to form a single mailpiece. From step 240, the method advances to step 242 where the mailpiece is fed to mail processing apparatus for finishing. A key element of the overall system is the timing of the two data streams so as to properly combine the printed document with its respective printed envelope for insertion at this step.

Turning to FIG. 5, there is shown a relational flowchart of the invention method consisting of three subsystems (250, 255, and 265) that together form a matched mail embodiment of the present invention.

Subsystem 250 is comprised of document generator 252 which is generally the host application that produces the document data. Subsystem 250 interfaces with subsystem 255.

Subsystem 255 is comprised of: document buffer manager 256(a) and its corresponding document buffer 256(b); address parser 258; addressing module driver 260; and, document printing module driver 262. Document buffer manager 256(a) is responsible for managing the document data and address data flows from document generator 252 through to the printing of that data on to either an envelope or to a cut sheet. The document being worked upon by the system is stored in document buffer 256(b) which is under the control of document buffer manager 256(a). From document buffer 256(b), the document data is transmitted to address parser 258 which will then begin to perform address

and zip code parsing based upon the combined data received; thereby, the address data can be separated out from document or graphics data. The address is then scanned for a postal zip code.

The elements of a postal zip code consist of four parts; these are: (i) the "zip code," which consists of 5 digits and refers to geographic area or zone; (ii) the "zip plus 4" further breaks down a zip code region into smaller sub-regions, this consists of four digits added to the base zip code; (iii) "delivery point digits" which consist of two additional digits that further break down a zip plus 4 so that the United States Postal Service (U.S.P.S.) can more accurately pin point an exact location; and, (iv) a check sum digit. The delivery point digits are abstracted from the street line of the address using a U.S.P.S. approved algorithm.

When the delivery point digits have been added to the zip code, addressing module driver 260 will direct that a bar code be determined that corresponds to the newly created zip code. The determination of the bar code is subject to a series of rules resident in the print memory; these rules correspond to bar code type and translate the human readable zip code to the machine readable bar code. The bar code address data will then be positioned by addressing module driver 260 for printing to a selected substrate.

In addition to document data, document generator 252 can pass printer commands that will be utilized by addressing module driver 260 and document printing module 262. The printer command data, print data, and additional commands if any, are downloaded to addressing module driver 260 and to document printing module driver 262. The two drivers will prepare their respective printers to receive the combined data. Additionally, if there is a jam within the feed path of printing mechanisms 266 and 268, the jam information will be relayed to printer drivers 260 and 262 which in turn will transmit the jam information to document buffer manager 256(a) so that the buffer manager can stop the flow of document data and restart or restore the document data stream.

Subsystem 265 comprises the printers that will print the separate document and address data streams. In subsystem 265, the bar code, address data, and graphics data if any, are printed on the envelope by addressing module 266 and the document data is printed on its respective cut sheets by document printing module 268.

As can be appreciated by those skilled in the art, a number of variations of the subject invention are possible. These variations include, but are not limited to: the elements forming the mail apparatus used for finishing of the mail-piece; the decision to use matched mail as opposed to non-matched mail; the capabilities of the printers with respect to the assignment of bar codes to address data; the nature of the document generator; and, the arrangement of jam sensors within the feed path of the envelopes or cut sheets.

What is claimed is:

1. A method of in-line addressing comprising the steps of:

- (a) generating document data in a data processing system and transmitting said document data to a document printer;
- (b) generating, essentially simultaneously with said generation of said document data, address data in said data processing system and transmitting said address data to an envelope printer;
- (c) printing said document data, at said document printer, onto a substrate and feeding said printed substrate to an accumulator;

- (d) printing, at said envelope printer, said address data upon one or more envelopes;
- (e) preparing at said accumulator, predetermined batches of one or more sheets of said printed substrate for feeding into a sheet folder;
- (f) folding said predetermined batches in said sheet folder and then feeding said folded batches to said inserter; and, wherein further said sheet feeder, said accumulator, said sheet folder, and said inserter comprise a folder/inserter system;
- (g) timing envelope throughput of said envelope printer to match batch throughput of said predetermined batch in said folder/inserter system;
- (h) inserting said folded batches into one or more envelopes to form a stuffed envelope;
- (i) sealing each of said stuffed envelopes; and
- (j) transporting said sealed envelope to a mail processing apparatus.

2. The method of claim 1, wherein said envelope printer is placed in-line so that said address data is printed upon said one or more envelopes before feeding said printed envelopes to said inserter.

3. The method of claim 1, wherein said envelope printer is placed in-line so that said address data is printed upon said stuffed envelopes; and said printed envelopes are fed to a sealer wherein said printed envelopes are sealed.

4. The method of claim 1, wherein said envelope printer is capable of printing on an envelope: a return address; a destination address; and, a bar code in respect of said destination address.

5. The method of claim 1, wherein said address data is merged with graphics data so that said envelope printer is capable of printing graphics on said envelope.

6. The method of claim 1, wherein said folder/inserter system times passage of said substrate as said substrate is fed through said folder/inserter system, and if said time exceeds a predetermined threshold, then determining that said substrate is jammed or out of alignment thus causing a feed path error.

7. The method of claim 6, wherein if it is determined that said feed path error has occurred, then said folder/inserter system transmits a first signal to a system operator wherein said first signal is indicative of said feed path error; and, said folder/inserter system transmits a second signal to said data processing system wherein said second signal is indicative of said feed path error and wherein said second signal is an instruction to said data processing system to stop transmitting said document data to said document printer and to stop transmitting said address data to said envelope printer.

8. A method of in-line addressing comprising the steps of:

- (a) entering document data into a data processing system and transmitting said document data to a document printer;
- (b) generating address data in said data processing system and transmitting said address data to an envelope printer;
- (c) printing said document data, at said document printer, onto a substrate and feeding said printed substrate to an accumulator;
- (d) printing, at said envelope printer, said address data upon one or more envelopes;
- (e) preparing at said accumulator, predetermined batches of one or more sheets of said printed substrate for feeding into a sheet folder;
- (f) folding said predetermined batches in said sheet folder and then feeding said folded batches to said inserter;

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and, wherein further said sheet feeder, said accumulator, said sheet folder, and said inserter comprise a folder/inserter system;

- (g) timing envelope throughput of said envelope printer to match batch throughput of said predetermined batch in said folder/inserter system;
- (h) inserting said folded batches into one or more envelopes to form a stuffed envelope;
- (i) sealing each of said stuffed envelopes; and
- (j) transporting said sealed envelope to a mail processing apparatus.

9. The method of claim 8, wherein said envelope printer is placed in-line so that said address data is printed upon said one or more envelopes before feeding said printed envelopes to said inserter.

10. The method of claim 8, wherein said envelope printer is placed in-line so that said address data is printed upon said stuffed envelopes; and said printed envelopes are fed to a sealer wherein said printed envelopes are sealed.

11. The method of claim 8, wherein said envelope printer is capable of printing on an envelope: a return address; a destination address; and, a bar code in respect of said destination address; and, wherein said address data can be

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merged with graphics data so that said envelope printer is capable of printing graphics on said envelope.

12. The method of claim 11, wherein said folder/inserter system times passage of said substrate as said substrate is fed through said folder/inserter system, and if said time exceeds a predetermined threshold, then determining that said substrate is jammed or out of alignment thus causing a feed path error.

13. The method of claim 12, wherein if it is determined that said feed path error has occurred, then said folder/inserter system transmits a first signal to a system operator wherein said first signal is indicative of said feed path error; and, said folder/inserter system transmits a second signal to said data processing system wherein said second signal is indicative of said feed path error and wherein said second signal is an instruction to said data processing system to stop transmitting said document data to said document printer and to stop transmitting said address data to said envelope printer.

14. The method of claim 8, wherein said envelope printer utilizes RAM memory and wherein said graphics data is downloaded into said RAM memory prior to receipt of said address data.

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(45) **Date of Patent:** **Mar. 25, 2003**

(54) **IMAGE FORMING APPARATUS FOR
 SORTING AND DISCHARGING PRINTED
 SHEETS INTO MAIL BINS**

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(52) **U.S. Cl.** **700/227; 700/223; 700/224;
 700/226; 270/52.02**

(58) **Field of Search** **270/52.02; 700/223,
 700/224, 225, 226, 227; 209/52.02**

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(57) **ABSTRACT**

An image forming apparatus includes a printer section for printing an image on a sheet and a finisher having a plurality of mail bins. The image forming apparatus discharges print, which is addressed to a specified user and outputted from the printer section, onto the mail bin assigned to the user among the plurality of mail bins, facilitating mail bin assignment to allow labor of network management to be saved. There is provided a card reading device for reading an ID card for identifying a user. There is also provided assigning means that identifies the user from information read by the card reading device when the ID card is inserted into the card reading device and that assigns a mail bin to the user when no mail bin has been assigned to the user.

20 Claims, 9 Drawing Sheets

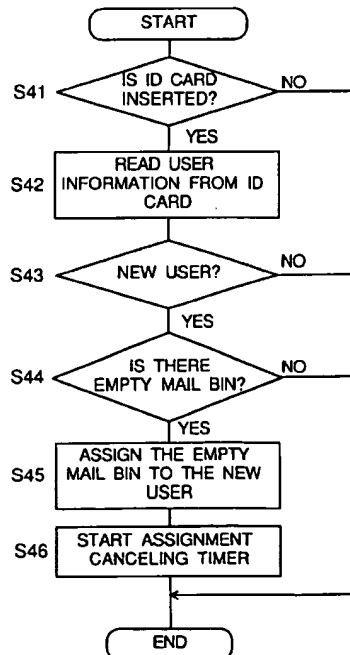


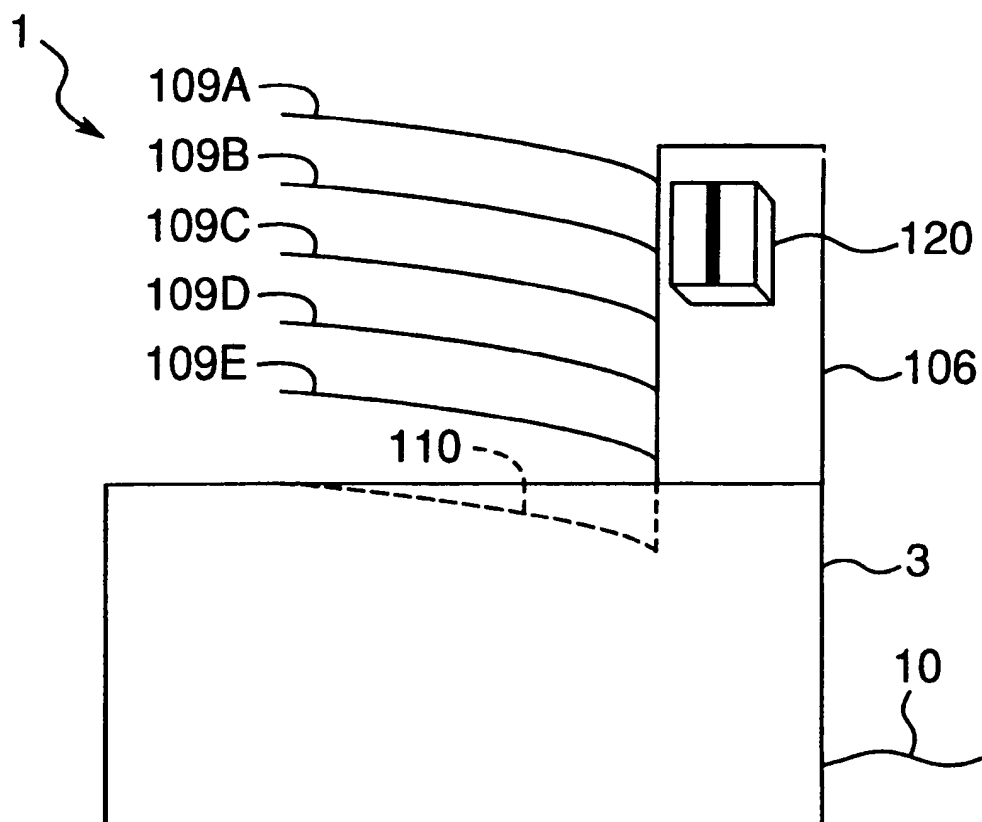
Fig. 1

Fig. 2

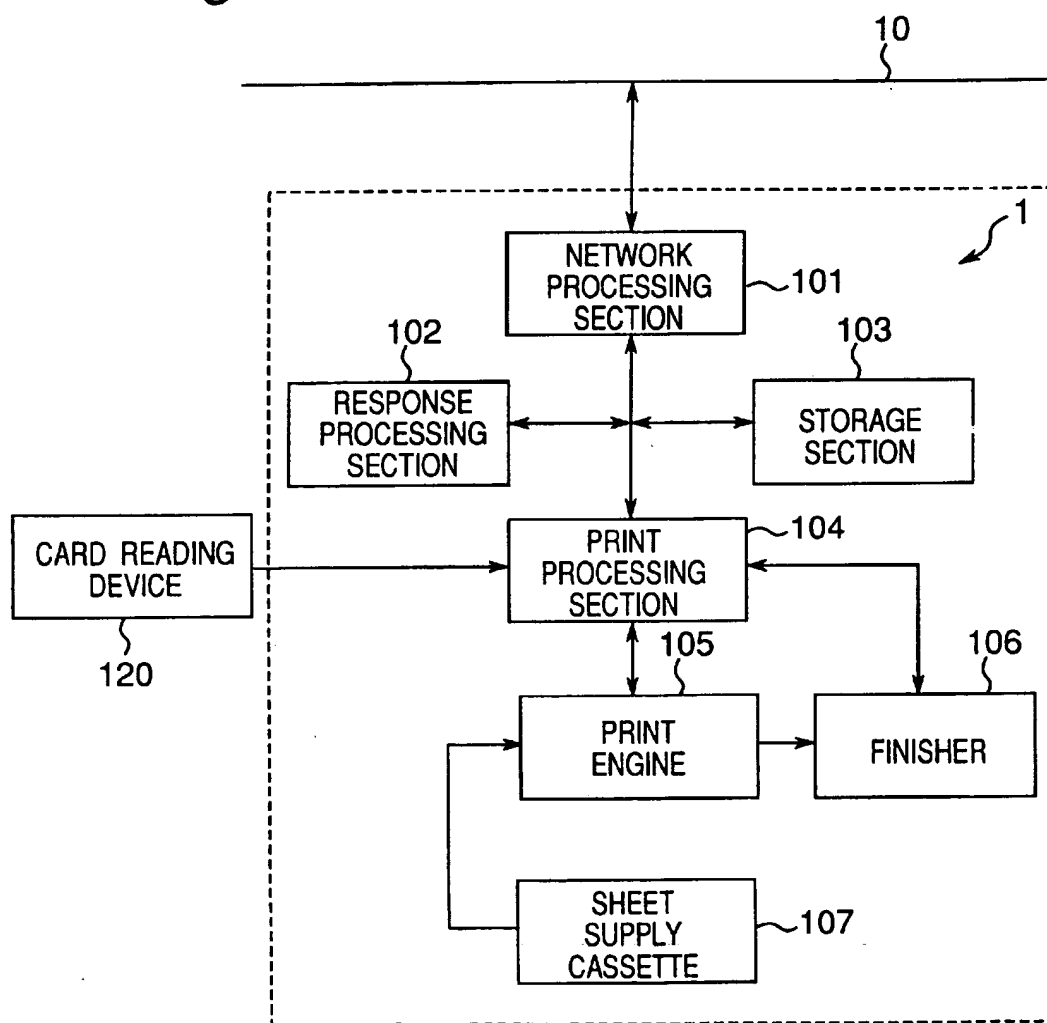


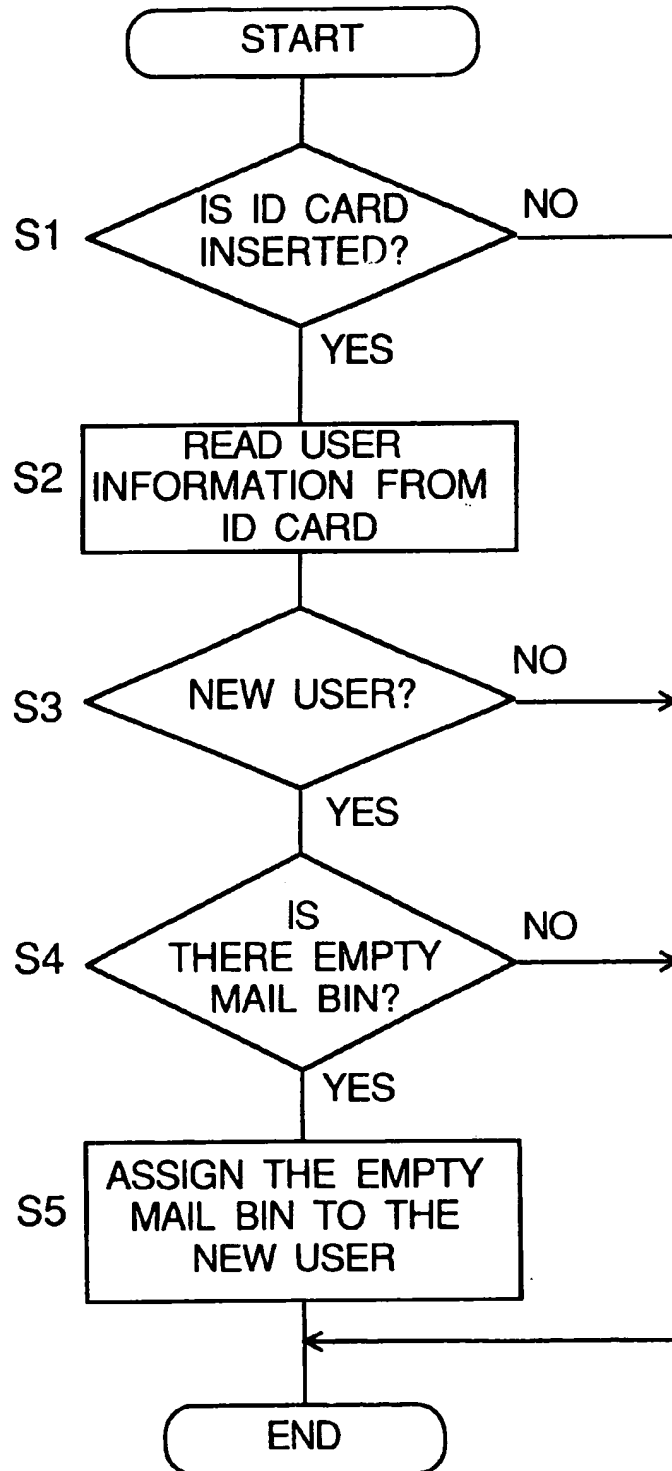
Fig.3

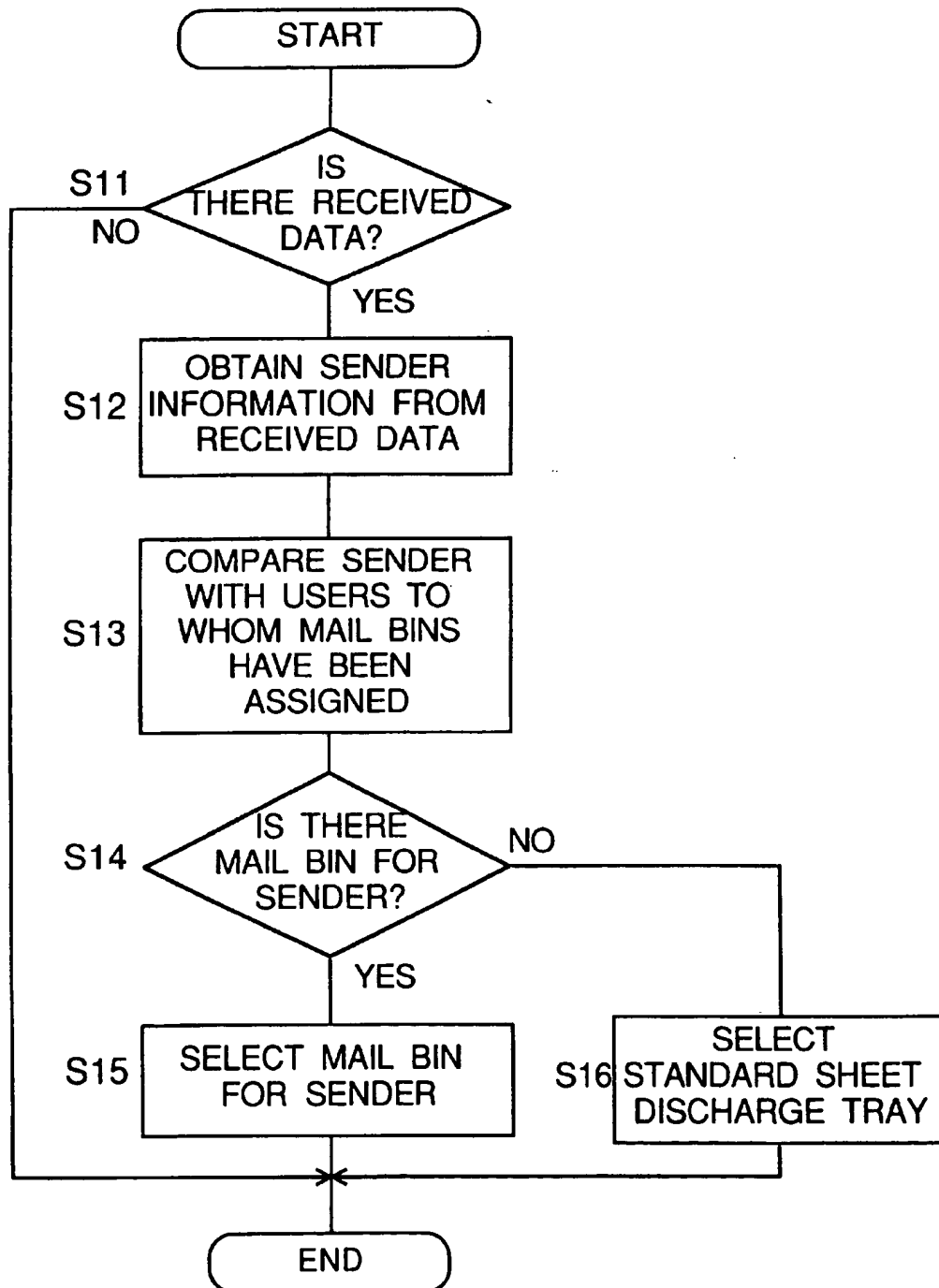
Fig. 4

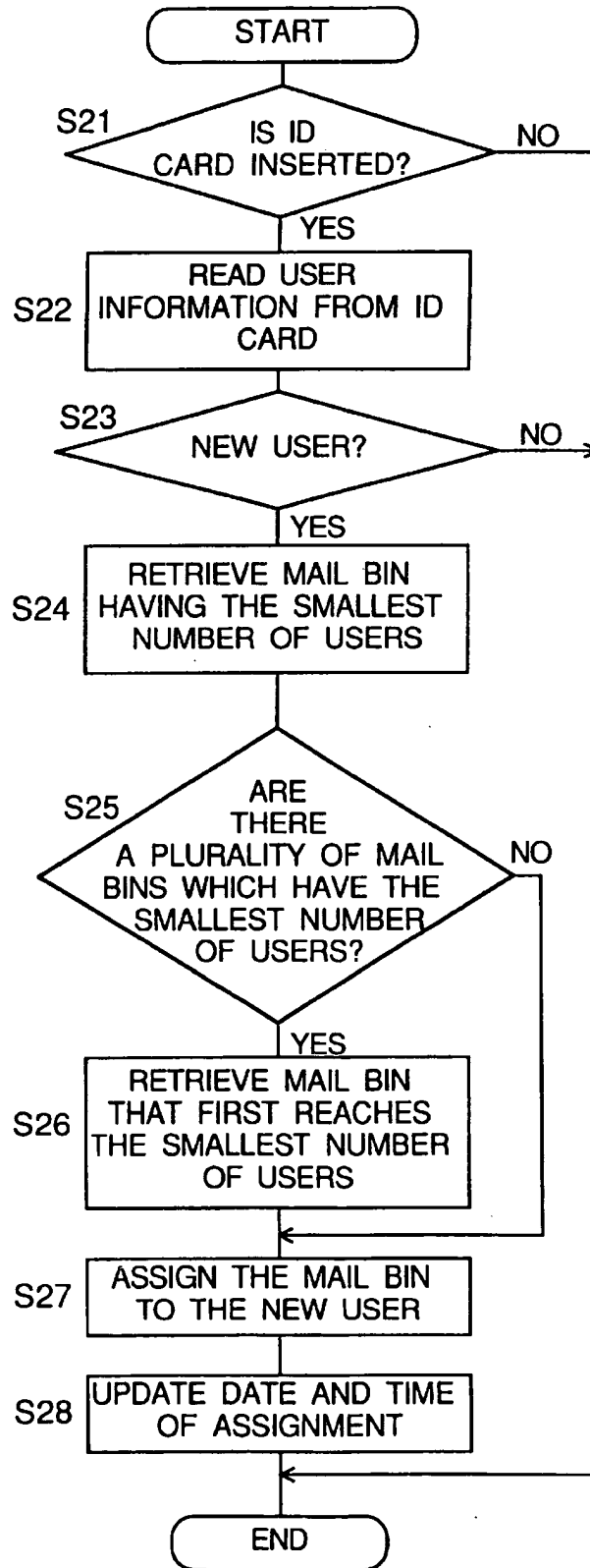
Fig.5

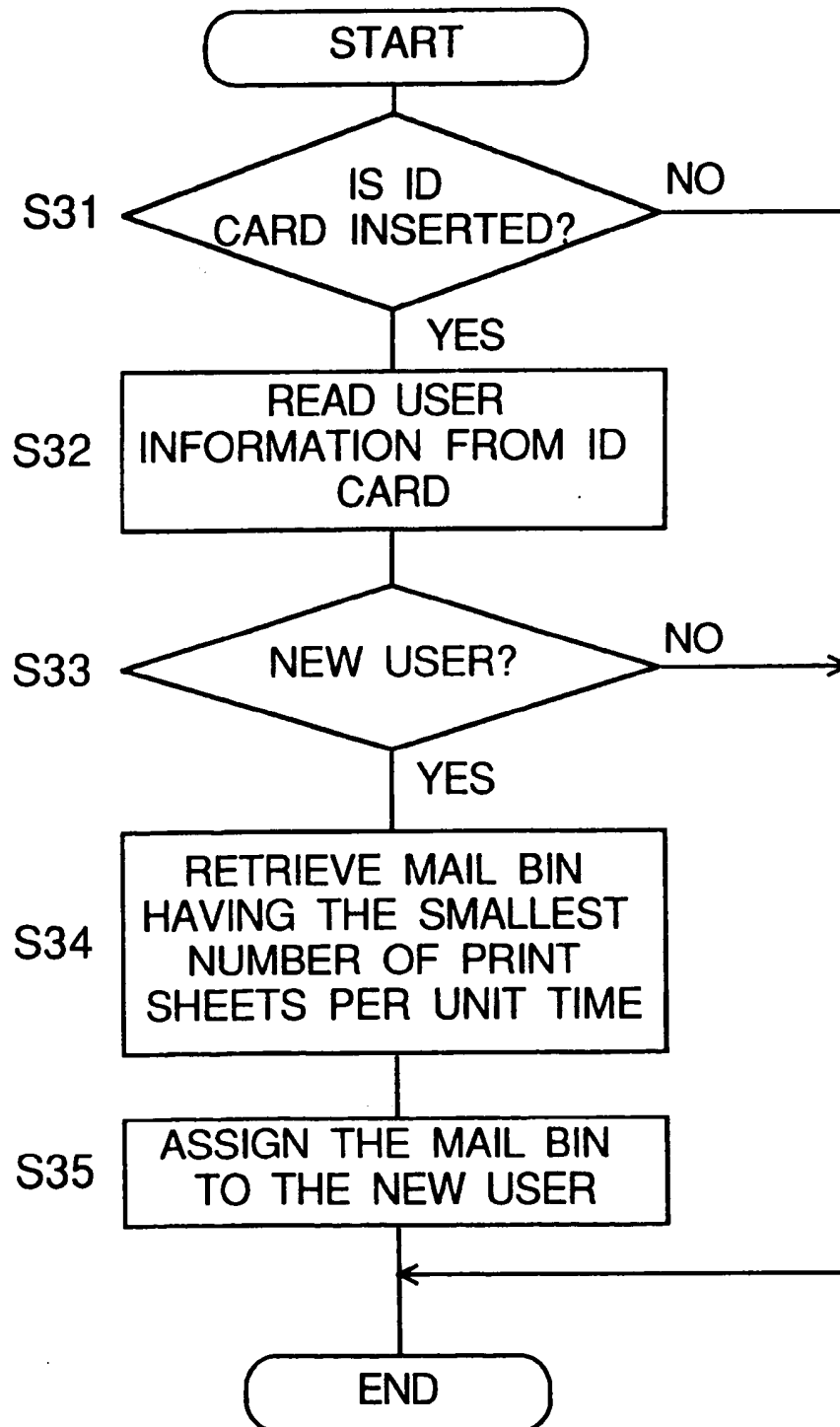
Fig.6

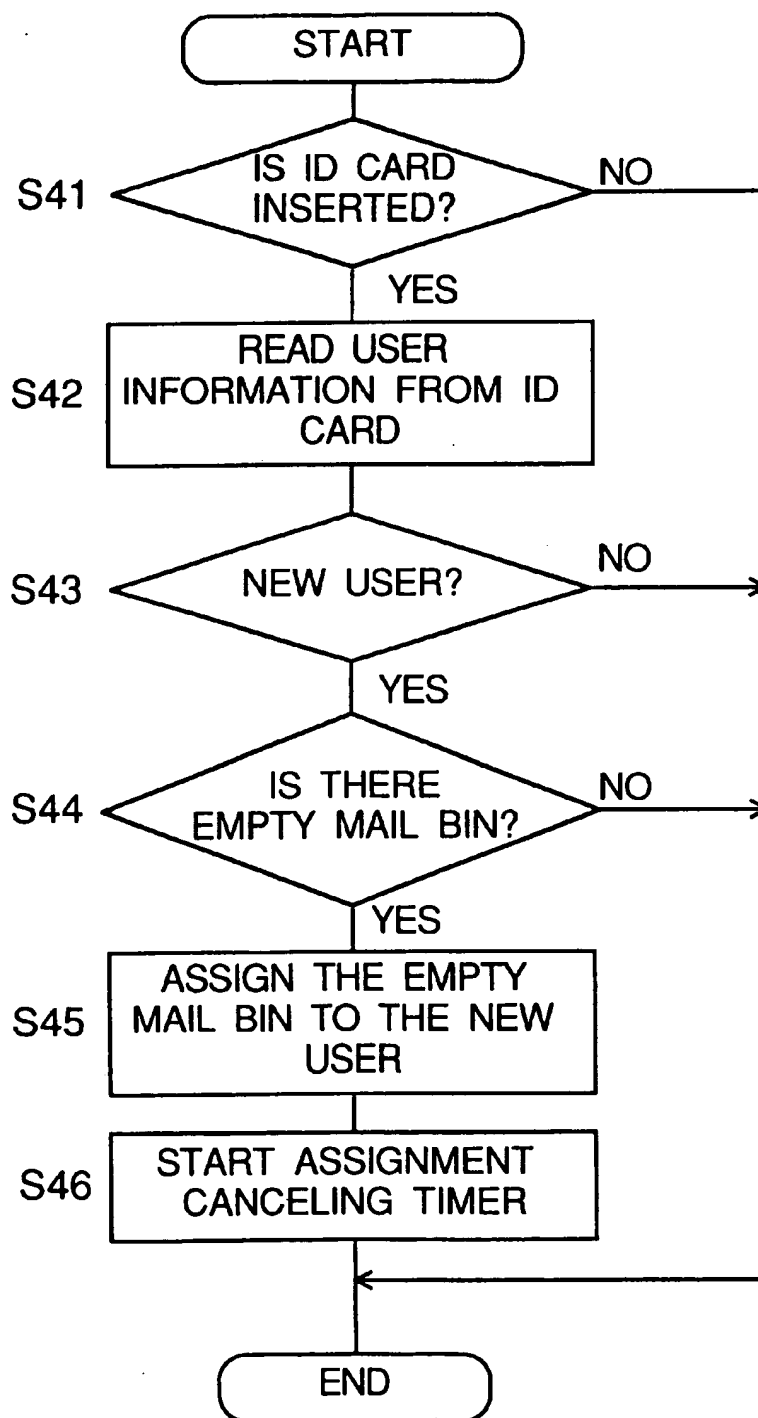
Fig. 7

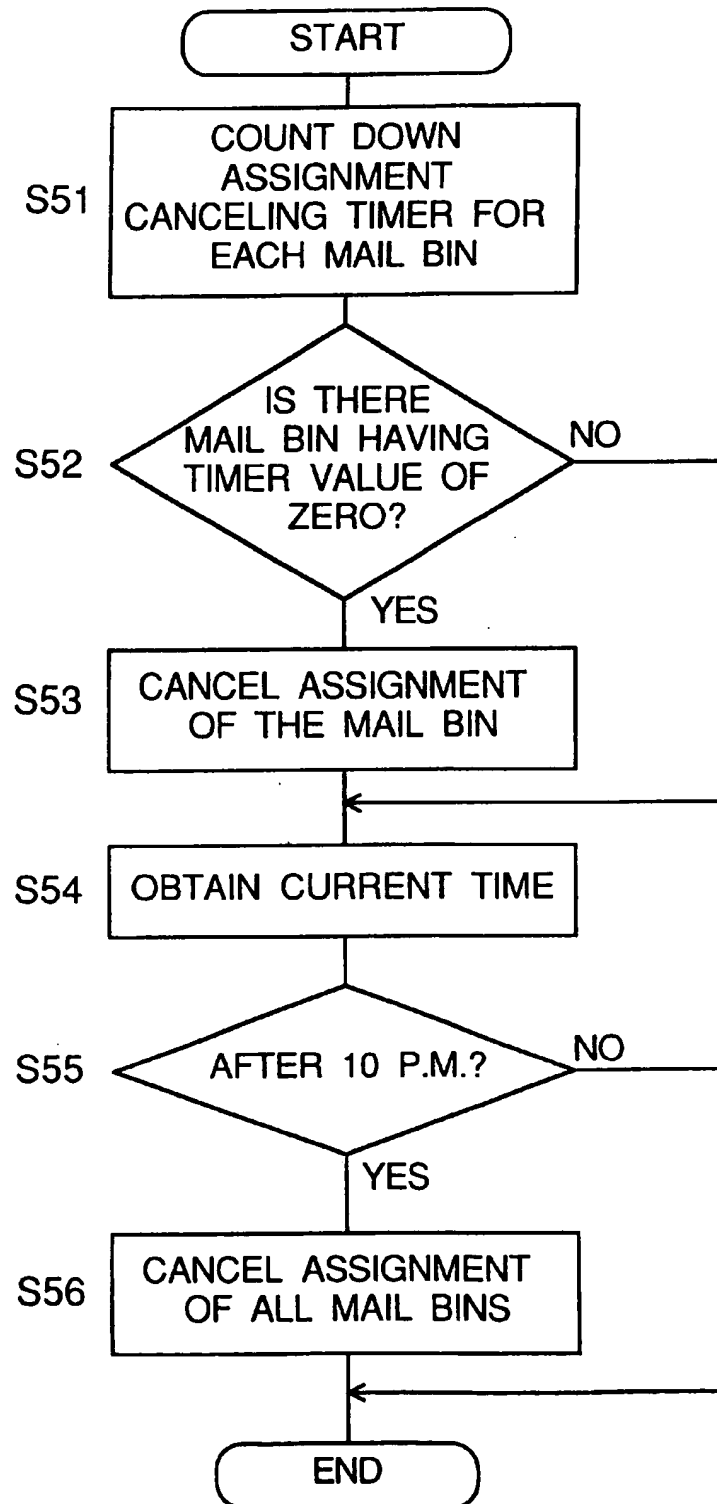
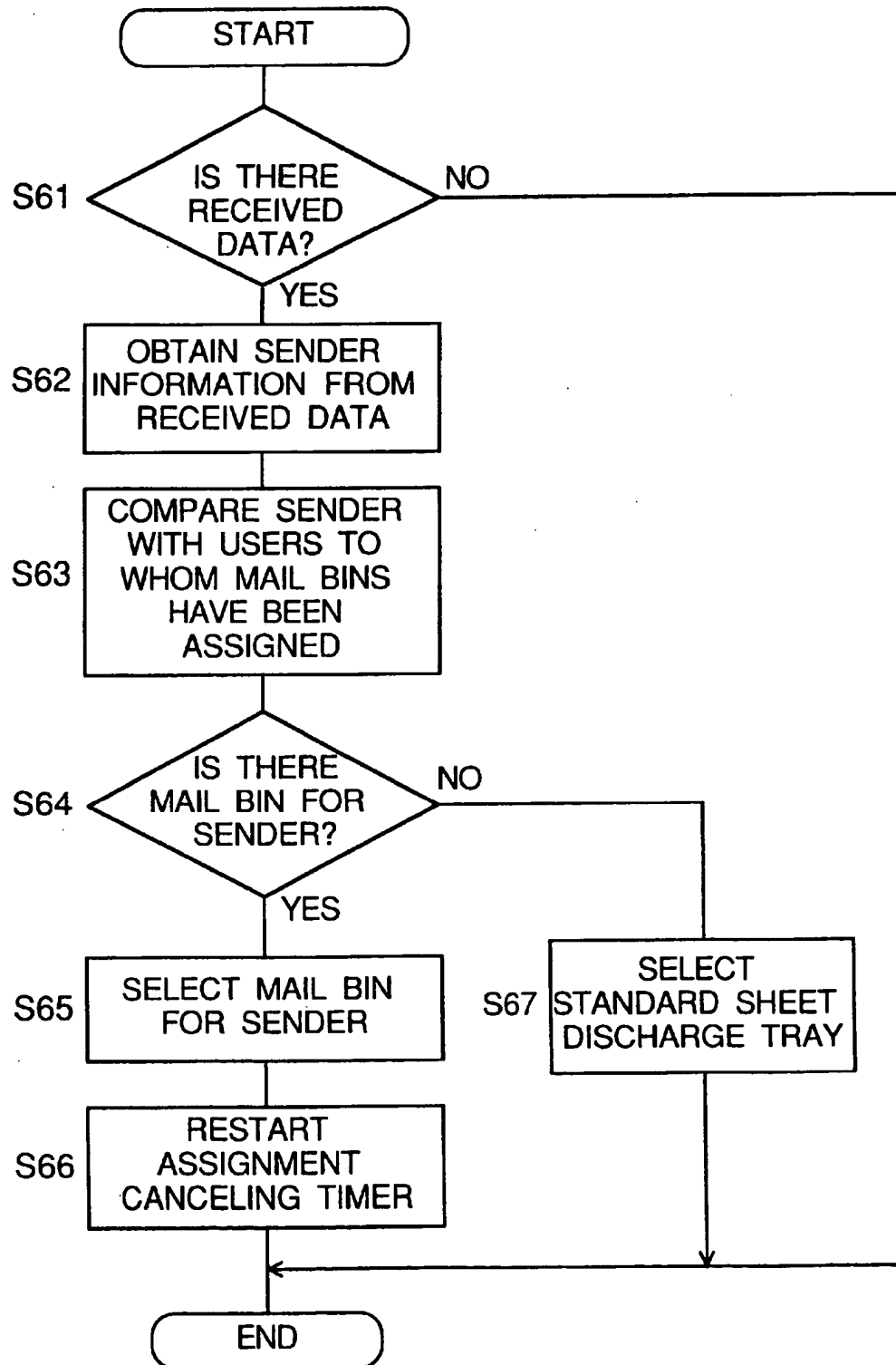
Fig.8

Fig.9

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IMAGE FORMING APPARATUS FOR SORTING AND DISCHARGING PRINTED SHEETS INTO MAIL BINS

This application is based on application No. H11-232662 filed in Japan, the entire content of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

The present invention relates to an image forming apparatus, and in particular, to an image forming apparatus that has a printer section for printing an image on a sheet and a finisher having a plurality of mail bins and that sorts and discharges printed sheets into the mail bins.

In general, according to this type of image forming apparatus, each mail bin is preparatorily assigned to each user by operating an operation panel mounted on a main body of the image forming apparatus or by operating a utility at a terminal on a network. Upon receiving a print job from a specified user through the network, the image is printed on a sheet in the printer section, and the printed sheet is discharged onto the mail bin assigned to the user among a plurality of mail bins.

However, in the case that the image forming apparatus is used in an office or the like, then the mail bin assignment is to be redone by operating the operation panel mounted on the image forming apparatus main body or by operating the utility at the network terminal when organizational changes or personnel changes occur in the relevant office or the like. This leads to an disadvantage that management of the network becomes troublesome.

Accordingly, the object of the present invention is to provide an image forming apparatus capable of saving a labor of network management by facilitating mail bin assignment. It is a further object to provide an image forming apparatus that allows a greater number of users to smoothly use mail bins of the image forming apparatus.

SUMMARY OF THE INVENTION

In order to achieve the above-mentioned objects, the present invention provides an image forming apparatus that includes a printer section for printing an image on a sheet and a finisher having a plurality of mail bins and that discharges print, which are addressed to a specified user and outputted from the printer section, onto the mail bin assigned to the user among the plurality of mail bins. The image forming apparatus further includes a card reading device for reading an ID from an ID card for identifying the user and assigning means for assigning a mail bin to the user who is identified from ID information read by the card reading device.

In the image forming apparatus of the present invention, the assigning means identifies the user from the ID information read by the card reading device and assigns a mail bin to the user. As a result, print that is outputted from the printer section and addressed to the user is discharged onto the mail bin assigned to the user. This arrangement obviates need for redoing the mail bin assignment by operating an operation panel mounted on a main body of the image forming apparatus or by operating a utility at a network terminal when organizational changes or personnel changes occur in an office or the like where this image forming apparatus is used. As a result, labor of network management can be saved.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the

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accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a diagram showing an external appearance of a printer according to one embodiment of the present invention;

FIG. 2 is a block diagram of the above printer;

FIG. 3 is a chart showing an example of a mail bin assigning process flow in the above printer;

FIG. 4 is a chart showing a print job processing flow in the above printer;

FIG. 5 is a chart showing an example of an assigning process flow in assigning each mail bin to a plurality of users in the above printer;

FIG. 6 is a chart showing another assigning process flow in assigning each mail bin to a plurality of users in the above printer;

FIG. 7 is a chart showing a mail bin assigning process flow on the assumption that an mail bin assignment is compulsorily canceled in the above printer;

FIG. 8 is a chart showing a mail bin assignment canceling process flow in the above printer; and

FIG. 9 is a chart showing a print job processing flow on the assumption that the mail bin assignment is compulsorily canceled in the above printer.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be described in detail below on the basis of embodiments shown in the drawings.

FIG. 1 shows an external appearance of a printer 1 according to one embodiment of the present invention, the printer 1 being connected to a network 10. This printer 1 includes a main body 3 and a finisher 106. The main body 3 has a built-in print engine for outputting print on sheets and a standard sheet discharge tray 110 formed in its upper portion. The finisher 106 has a plurality of mail bins 109A, 109B, . . . , 109E that protrude above the standard sheet discharge tray 110. The finisher 106 sorts and discharges the printed sheets onto the standard sheet discharge tray 110 or the mail bins 109A, 109B, . . . , 109E. A card reading device 120 is mounted on a side surface of the finisher 106 so as to read an ID card for identifying a user.

FIG. 2 shows a block diagram of the printer 1. This printer 1 is constructed of a print-processing section 104, a print engine 105, a sheet supply cassette 107, the above-mentioned finisher 106, a network processing section 101, a storage section 103 and a response processing section 102. The print processing section 104 executes a control process of the whole printer. The print engine 105 outputs print on sheets. The sheet supply cassette 107 contains sheets having a specified size. The network processing section 101 executes control of data transfer between the network 10 and the printer 1. The storage section 103 stores information of the presence or absence and the size of a sheet contained in the sheet supply cassette 107, data processing resolution, manageable page-description language and so on. The response processing section 102 transmits information, which is stored in the storage section 103 according to an inquiry request from a terminal such as personal computer (not shown) connected to the network 10, to the terminal.

As shown in FIG. 3, the mail bins 109A, 109B, . . . , 109E are respectively assigned to users by the print processing section 104 that operates as assigning means. Specifically, the print processing section 104 first determines whether or

not an ID card is inserted in the card reading device 120 (S1) and identifies a user of the ID card from the information read by the card reading device 120 when the ID card is inserted in the card reading device 120 (S2). Then, it is determined whether or not the user is a new user, i.e., whether or not a mail bin has already been assigned to the user (S3). If the user is a new user, it is determined whether or not there is a mail bin that has not yet been assigned (this bin being referred to as an "empty mail bin" hereinafter) among the mail bins 109A, 109B, . . . , 109E (S4). If there is an empty mail bin, then the empty mail bin is assigned to the user (S5). In this example, if the user is not a new user, then another mail bin is not assigned to the new user. Even if there is no empty mail bin, a plurality of users do not use one mail bin in common.

When a user dispatches a print job to the printer 1 from a terminal (not shown) connected to the network 10 so as to output print on sheets and discharge the sheets onto a mail bin assigned to the user, then a process as shown in FIG. 4 is executed. First, the print processing section 104 determines whether or not there is data received through the network 10, i.e., whether or not the network processing section 101 has received a print job (S11). If the network processing section 101 has received the print job, then the network processing section 101 obtains information of a sender included in the received data i.e. information of a new user who dispatches a print job to the printer 1 from the terminal (S12). Subsequently, the sender is compared with the users to whom the mail bins have already been assigned (S13), and it is determined whether or not there is a mail bin to be assigned to the sender (S14). If there is the mail bin to be assigned to the sender, the print processing section 104 sends the finisher 106 instructions of selecting the mail bin to be assigned to the sender. On the other hand, the print engine 105 takes out sheets one by one from the sheet supply cassette 107, outputs print on each sheet and feeds the printed sheets into the finisher 106. The finisher 106, discharges the printed sheets onto the mail bin assigned to the sender according to the above instructions from the print processing section 104 (S15). If there is no mail bin assigned to the sender (S14), the printed sheets are discharged onto the standard sheet discharge tray 110 (S16).

In the case of the above arrangement, even when a organizational change or a personnel change occurs in an office or the like, it is not necessary to redo the mail bin assignment by operating an operation panel on the main body 3 of the image forming apparatus or by operating the utility at the terminal of the network 10, facilitating mail bin assignment. As a result, the labor of network management can be saved.

If the number of users is greater than the number of mail bins and there is no empty mail bin, then sharing of the mail bins is required to be permitted. FIG. 5 shows an example of a flow of assigning each mail bin to a plurality of users in the above-mentioned case. It is assumed that the print processing section 104 is consistently monitoring the frequency in use of the mail bins 109A, 109B, . . . , 109E. First, the print processing section 104 determines whether or not an ID card is inserted into the card reading device 120 (S21) and identifies a user of the ID card from the information read by the card reading device 120 when an ID card is inserted into the card reading device 120 (S22). Then, it is determined whether or not the user is a new user, i.e., whether or not a mail bin has already been assigned to the user (S23). If the user is a new user, then a mail bin which is assigned to the smallest number of users is retrieved from among the plurality of mail bins 109A, 109B, . . . , 109E (S24). If there

are a plurality of mail bins which each are assigned to the smallest number of users (S25), then the mail bin that was first assigned to the smallest number of users is retrieved (S26) to be selected and assigned to the above-mentioned user (S27). Further, the date and time of assignment is updated (S28).

When a mail bin which was first assigned to the smallest number of users is selected and assigned to a new user as stated above, the number of users in a specified mail bin is does not excessively increase, consequently averaging the number of users in each mail bin. Therefore, a greater number of users can smoothly use the mail bins. Furthermore, if there are a plurality of mail bins which each are assigned to the smallest number of users, then the mail bin that first reached the smallest number of users is selected. Therefore, the number of users in a certain mail bin does not rapidly increase, and this can avoid confusion ascribed to the increase in the number of users in each mail bin.

FIG. 6 shows an example of another flow of assigning each mail bin to a plurality of users. It is assumed that the print processing section 104 is consistently monitoring the frequency in use of the mail bins 109A, 109B, . . . , 109E, in the same manner as the above-mentioned example. First, the print processing section 104 determines whether or not an ID card is inserted into the card reading device 120 (S31) and identifies a user of the ID card from the information read by the card reading device 120 when the ID card is inserted into the card reading device 120 (S32). Then, it is determined whether or not the user is a new user, i.e., whether or not a mail bin has already been assigned to the user (S33). If the user is a new user, a mail bin of the smallest number of print sheets discharged per unit time is retrieved from among the plurality of mail bins 109A, 109B, . . . , 109E (S34), and the mail bin is selected and assigned to the above-mentioned user (S35).

If the mail bin having the smallest number of print sheets discharged per unit time is thus selected, then, with relation to the mail bins used with a comparatively high frequency, the increase in the number of users is restricted, and this can avoid confusion ascribed to the increase in the number of users in the mail bins.

If the number of users is greater than the number of mail bins and therefore each mail bin is assigned to a plurality of users, then in addition to the above method there can be considered a method for carrying out assignment of each mail bin to users so as not to overlap his printout time zones with the other ones, by comparing a printout time zone in which the user who is about to undergo mail bin assignment principally puts printout into practice with a printout time zone in which users who have already undergone mail bin assignment put printout into practice.

FIG. 7, FIG. 8 and FIG. 9 show flows including a process for compulsorily canceling the mail bin assignment in order to avoid confusion in assignment when the number of users is greater than the number of mail bins. It is assumed that the print processing section 104 operating as canceling means has a built-in assignment canceling timer in which a count time of 30 minutes has been preparatorily set in correspondence with each mail bin in order to compulsorily cancel the mail bin assignment.

As shown in FIG. 7, in the mail bin assignment stage, the print processing section 104 first determines whether or not an ID card is inserted into the card reading device 120 (S41) and identifies a user of the ID card from the information read by the card reading device 120 when an ID card is inserted

into the card reading device 120 (S42). Then, it is determined whether or not the user is a new user, i.e., whether or not a mail bin has already been assigned to the user (S43). If the user is a new user, then it is determined whether or not there is an empty mail bin among the mail bins 109A, 109B, . . . , 109E (S44). If there is an empty mail bin, then the empty mail bin is assigned to the new user (S45). Then, at the instant when the mail bin is assigned, the built-in assignment canceling timer that belongs to the print processing section 104 and used for the mail bin starts countdown (S46). In this example, if the user is not a new user, then no other mail bin is assigned to the user. Also, even if there is no empty mail bin, one mail bin is not assigned to a plurality of users.

When the user dispatches a print job to the printer 1 from a terminal (not shown) connected to the network 10 so as to output print to the mail bin assigned to the user himself or herself during the countdown of this built-in assignment canceling timer, a process as shown in FIG. 9 is-executed. First, the print processing section 104 determines whether or not there is received data through the network 10, i.e., whether or not the network processing section 101 has received a print job (S61). If the network processing section 101 has received a print job, then information representing the sender included in the received data is obtained (S62). Subsequently, the sender is compared with the users to whom the mail bins have already been assigned (S63), and it is determined whether or not there is a mail bin assigned to the sender (S64). If there is a mail bin assigned to the sender, then the print processing section 104 sends to the finisher 106 an instruction to select the mail bin assigned to the sender. On the other hand, the print engine 105 takes out sheets one by one from the sheet supply cassette 107, outputs print on each sheet and feeds the printed sheet into the finisher 106. The finisher 106 discharges the printed sheet onto the mail bin assigned to the sender according to the above instruction from the print processing section 104 (S65). Then, the countdown of the assignment canceling timer of the mail bin is restarted (S66). If there is no mail bin assigned to the sender (S64), then the printed sheets are discharged onto the standard sheet discharge tray 110 (S66).

From the instant when a mail bin is assigned to a user or from the instant when reception of a final print-job from the user is completed, as shown in FIG. 8, the assignment canceling timer of each mail bin is counted down (S51). Then, it is determined whether or not there is a mail bin of which the timer value becomes zero (S52). If there is a mail bin of which the timer value becomes zero, then the assignment of the mail bin is canceled (S53). That is, if no print job is received from a specified user to whom a certain mail bin has been assigned for a specified period (30 minutes in this example), then the assignment of the mail bin to the user is canceled. By this operation, only the user who actually uses the mail bin can maintain the assignment of the mail bin, while the assignment of the mail bin is canceled for the user who does not use the assigned mail bin for a specified period. Therefore, in the case where the number of the users is greater than the number of the mail bins or in a similar case, a greater number of users can smoothly use the mail bins. Time of the assignment canceling timer is set to 30 minutes because it is highly possible that the user who once obtains print would correct the contents through visual check and put print output into practice again, the time necessary for the correcting work being empirically presumed to be 30 minutes. Also, it is highly possible that the user would not subsequently use the printer for a time.

Next, the print processing section 104 obtains the current time referring to a built-in clock (S54), and after 10 p.m.

every day (S55), it cancels the assignment of all the mail bins (S56). Therefore, the mail bin assignment set during normal working hours of the day is infallibly canceled. Therefore, in the case where the number of users is greater than the number of mail bins, a greater number of users can smoothly use the mail bins.

This kind of canceling process can also be applied to the case where each mail bin is assigned to a plurality of users.

It is acceptable to cancel a mail bin assignment to a user when an ID card of the user is pulled out of the card reading device 120. In the above case, a mail bin is assigned to the user only when the user inserts the ID card into the card reading device 120, i.e., only when the user actually needs the mail bin. After the ID card is pulled out, the mail bin is regarded as unnecessary and the assignment of the mail bin is canceled. Further, it is also acceptable to cancel the assignment of a mail bin to a user when the user inserts again an ID card of the user into the card reading device 120 after the completion of a print job instead of the time when the ID card is pulled out of the card reading device 120.

Although the user dispatches a print job to the printer 1 from the terminal connected to the network 10 so as to output print to the mail bin assigned to the user himself or herself in the present embodiment, the present invention is of course not limited to this. Another sender may dispatch a print job to the printer 1 from a terminal connected to the network 10 so as to output print to the mail bin assigned to a certain user.

The present invention can be broadly applied to not only the so-called printer but also apparatuses such as a copying machine and a facsimile apparatus, which sort and discharge printed sheets into a plurality of mail bins.

As is apparent from the above, according to the image forming apparatus of the present invention, the assigning means identifies the user from the ID information read by the card reading device and assigns a mail bin to the user. As a result, the print that is outputted from the printer section and addressed to the user is discharged onto the mail bin assigned to the user. This facilitates the mail bin assignment and allows the saving of labor of network management.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. An image forming apparatus, comprising:

an image forming section for forming an image on a sheet; a plurality of bins;

a card reading device for reading information from an ID card;

assigning means for assigning a bin to a user corresponding to the information read by the card reading device; and

discharging means for discharging the sheet on which the image is formed by the image forming section into the bin assigned by the assigning means.

2. An image forming apparatus as claimed in claim 1, wherein

the assigning means determines whether or not a bin has already been assigned to the user corresponding to the information read by the card reading device.

3. An image forming apparatus as claimed in claim 2, wherein the assigning means is configured to select a bin

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which is assigned to a smallest number of users from among the plurality of bins when no bin has yet been assigned to the user corresponding to the information read by the card reading device, to assign the bin to the user.

4. An image forming apparatus as claimed in claim 3, wherein the assigning means is configured to select a bin that first reaches the smallest number of users when there are a plurality of bins which each are assigned to the smallest number of users, to assign the bin to the user.

5. An image forming apparatus as claimed in claim 1, wherein

the assigning means is configured to select a bin receiving a smallest number of sheets discharged per unit time, to assign the bin to the user.

6. An image forming apparatus as claimed in claim 1, further comprising:

canceling means for canceling assignment of a certain bin to a specified user when a print job from the specified user to whom the certain bin has been assigned is not received for a fixed time.

7. An image forming apparatus as claimed in claim 1, further comprising:

canceling means for canceling assignment of all bins to all users at an appointed time.

8. An image forming apparatus as claimed in claim 1, further comprising:

canceling means for canceling assignment of the bin to the user when the ID card of the user is pulled out of the card reading device.

9. An image forming apparatus as claimed in claim 1, wherein

the assigning means is configured to select an empty bin that has not yet been assigned to assign the empty bin to the user.

10. An image forming apparatus as claimed in claim 9, wherein

the assigning means is configured to select a specified sheet container when no empty bin exists to assign the specified sheet container to the user.

11. A sheet container unit that sorts inputted sheets into a plurality of bins and contains the inputted sheets, comprising:

card reading device for reading information from an ID card;

assigning means for assigning a bin to a user corresponding to the information read by the card reading device; and

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discharging means for discharging an inputted sheet into the bin assigned by the assigning means.

12. A sheet container unit as claimed in claim 11, wherein the assigning means determines whether or not a bin has already been assigned to the user corresponding to the information read by the card reading device.

13. A sheet container unit as claimed in claim 12, wherein the assigning means is configured to select a bin which is assigned to a smallest number of users from among the plurality of bins when no bin has yet been assigned to the user corresponding to the information read by the card reading device, to assign the bin to the user.

14. A sheet container unit as claimed in claim 13, wherein the assigning means is configured to select a bin that first reaches the smallest number of users when there are a plurality of bins which each are assigned to the smallest number of users, to assign the bin to the user.

15. A sheet container unit as claimed in claim 11, wherein the assigning means is configured to select a bin receiving a smallest number of sheets discharged per unit time, to assign the bin to the user.

16. A sheet container unit as claimed in claim 11, further comprising:

canceling means for canceling assignment of a certain bin to a specified user when a print job from the specified user to whom the certain bin has been assigned is not received for a fixed time.

17. A sheet container unit as claimed in claim 11, further comprising:

canceling means for canceling assignment of all bins to all users at an appointed time.

18. A sheet container unit as claimed in claim 11, further comprising:

canceling means for canceling assignment of the bin to the user when the ID card of the user is pulled out of the card reading device.

19. A sheet container unit as claimed in claim 11, wherein the assigning means is configured to select an empty bin to assign the empty bin to the user.

20. A sheet container unit as claimed in claim 19, wherein the assigning means is configured to select a specified sheet container when no empty bin exists to assign the specified sheet container to the user.

* * * * *

[54] MAIL PREPARATION SYSTEM

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[73] Assignee: Pitney Bowes Inc., Stamford, Conn.

[21] Appl. No.: 25,418

[22] Filed: Mar. 13, 1987

[51] Int. Cl.⁴ G06F 15/20; B65H 39/02

[52] U.S. CL. 364/478; 209/3.3;
209/584; 270/58; 270/1.1; 235/375; 364/464.03

[58] **Field of Search** 364/464, 466, 478;
209/900, 569, 583, 584, 3.1-3.3; 270/1.1, 4, 5,
54, 58; 53/266 A; 235/375, 432

[56] References Cited

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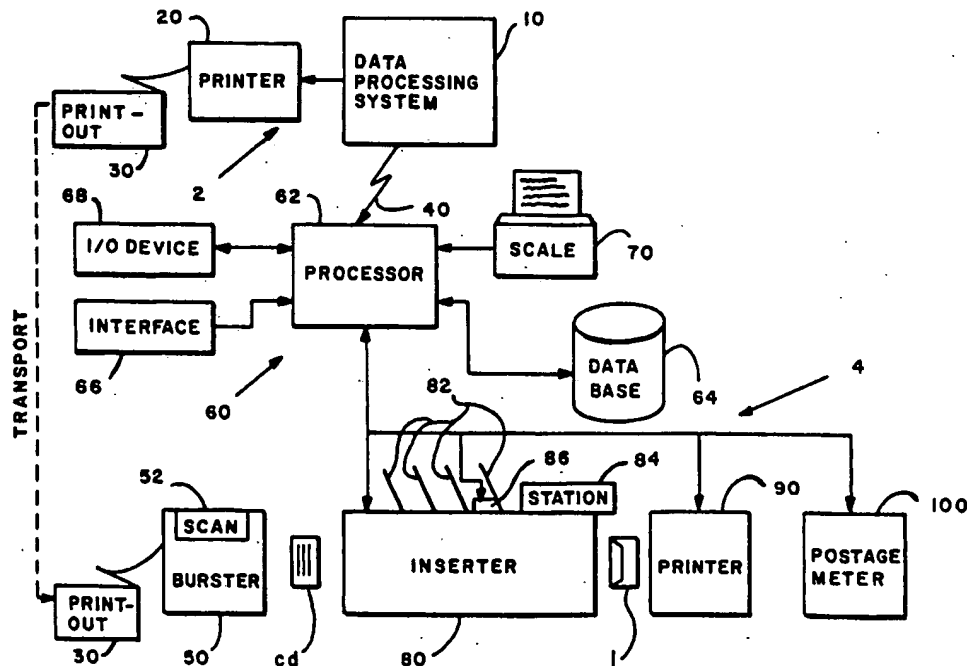
Primary Examiner—Joseph Ruggiero

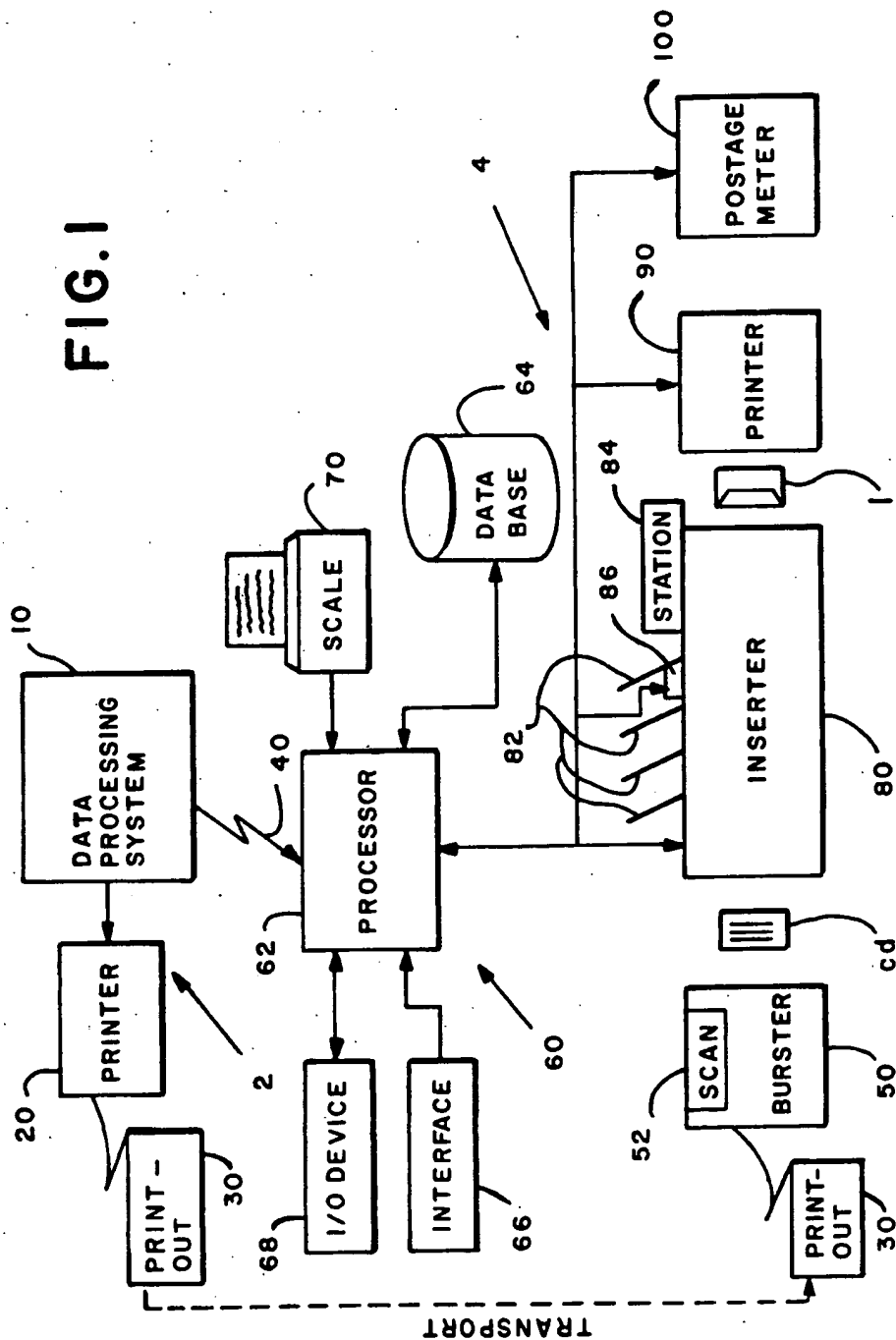
Attorney, Agent, or Firm—Donald P. Walker; David E. Pitchenik; Melvin J. Scolnick

[57] **ABSTRACT**

A system for the preparation of items to be mailed, preparation of each item varying in accordance with selected values of pre-determined parameters. The system includes apparatus for marking each item with selected identification code values; apparatus for preparing each item to be mailed in accordance with stored parameters, the preparing apparatus having a detector for detecting and outputting identification values from the items; a data base system for storing selected values of the parameters in associated with the identification codes, a control system responsive to the output identification codes to access the associated selected values for output to the preparation apparatus. The preparation apparatus of the subject system includes an inserted system and the pre-determined parameters include parameters defining the inserts to be assembled with an item. The preparation apparatus also includes a printer which is controlled to print information on the items in accordance with other pre-determined parameters. The identification codes are printed on control documents for each item by a data processing system which includes a post-processing subsystem for removing conventional dash codes and substituting identification codes, and transmitting records of the values of the pre-determined parameters to the data base system together with associated identification codes.

19 Claims, 3 Drawing Sheets





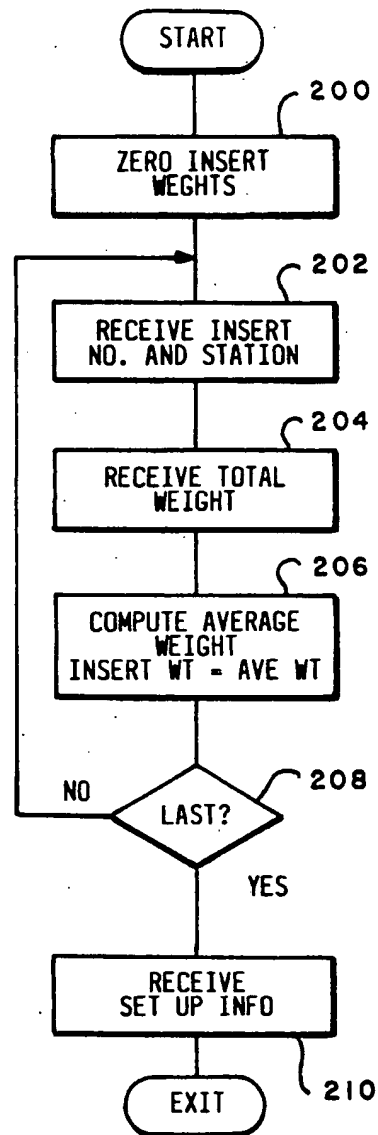
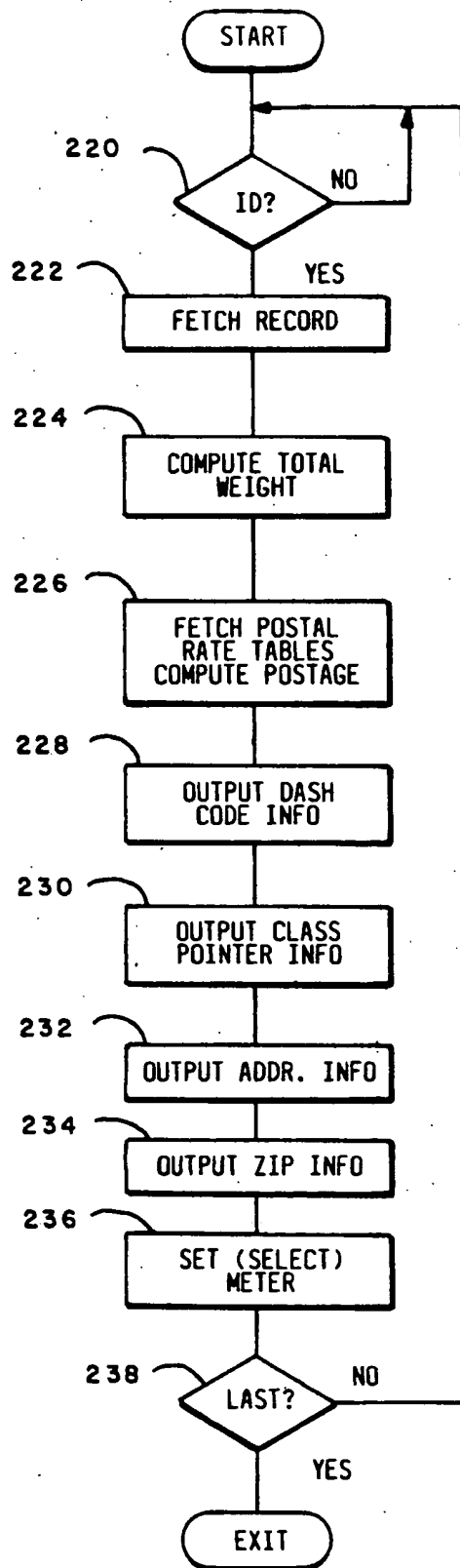


FIG. 2

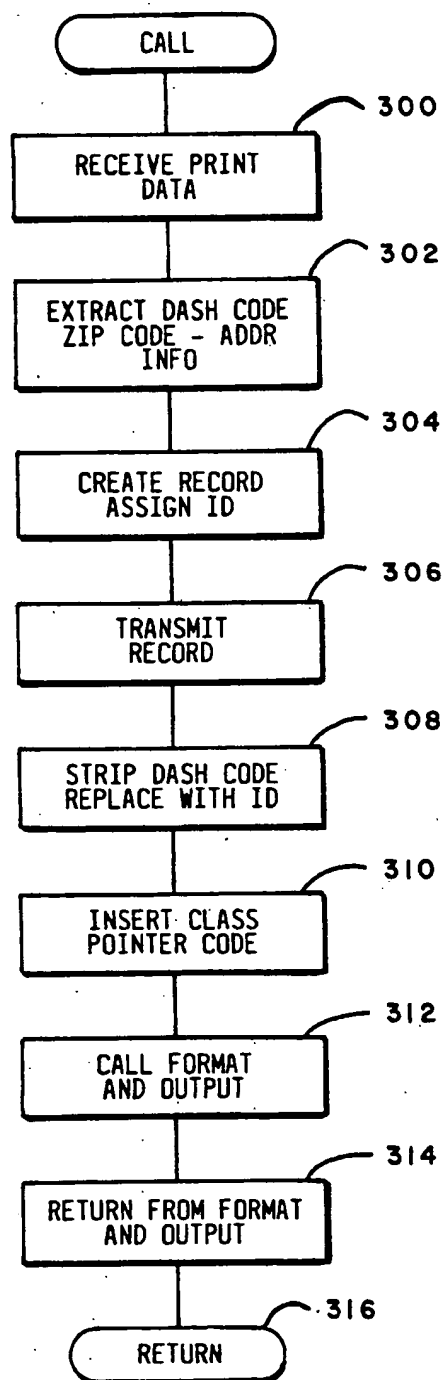


FIG. 3

MAIL PREPARATION SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to systems for the preparation of items to be mailed. More particularly, it relates to systems where the preparation for each item varies in accordance with selected values of pre-determined parameters.

Preparation of items to be mailed may include, but is not limited to, combinations of the following steps. The component elements of the item may be printed or otherwise prepared, appropriate elements comprising the item may be assembled, the assembled elements may be inserted into a carrier (e.g. an envelope), the carrier may be addressed (either before or after insertion of the elements), the appropriate zip code may be marked on the carrier in a machine readable code such as bar code, the proper postage amount for the item may be determined, and the item may be franked accordingly. Typically, high volume mailers have in the past, used systems for the preparation of items to be mailed which were based on a combination of electronic data processing operations and large inserter systems. Typically, the mailer's data processing operation would include systems for printing large batches of documents such as bills, bank statements, etc. on a periodic basis. These documents would generally be printed on conventional fan-fold computer printout paper and in addition to the human readable information intended for recipient would also include markings, referred to as "dash code" in the margins. The batch of documents would then be physically delivered to the mailroom for further preparation.

In the mailroom a "burster" would separate the fan-fold printout into discrete documents, generally referred to as "control documents", and feed these control documents to an inserter system. The burster also included a scanner which would read the dash code from the control documents and synchronously transmit this information to the inserter control system. The inserter control system would then use the information from the dash code to assemble selected inserts with the control documents and then insert the resulting assembly into an envelope. The envelope could then be transported through a conventional postage meter for franking. Such inserter systems are well known and are described in U.S. Pat. No. 4,571,925; for: Insertion Machine With Postage Categorization; to: Adams; issued: Feb. 25, 1986; which is hereby incorporated by reference. (As used herein "dash code" refers to conventional dash code and further includes other coding formats such as bar code and alphanumeric information readable by OCR, which may be used to control inserters).

Systems which include additional steps of mail preparation are also known. For example, a bar code printer may be included in the system to print the appropriate zip code in bar code on each envelope after insertion. The data processing system would be programmed to print the control document in a pre-determined sequence according to zip code and would include in the dash code a zip code break to indicate when to change to the next zip code. Systems where the weight of each item is computed from an a priori knowledge of the weight of each insert and the envelopes, the appropriate postage amount determined from the weight, and the

postage meter setting accordingly (or, more typically, one of a plurality of preset meters selected), are also known.

Such systems while useful and highly successful suffer from several disadvantages. Because the control information is printed on each control document as dash code, any change in the mail preparation, such as a change in the combination of inserts, requires that the control documents be reprinted; typically, a long lead time EDP operation. Also in systems where zip code bar code is printed, because of the limitations of the dash code, the zip code information for each control document can not be included in full on the control document. In prior art systems control documents would be printed in zip code sequence, as described above, and loss of the document indicating the zip code break could result in all the following items being mis-marked. A particular disadvantage of prior art systems is that they are unable to print address information on items to be mailed and have been forced to rely on techniques such as window envelopes for addressing. This is a great disadvantage to direct marketers because the bill-like look of a window envelope greatly reduced the chances that the recipient will open an item of direct mail.

Thus, it is an object of the subject invention to provide a mail preparation system having a more flexible means of control.

It is another object of the subject invention to provide a mail preparation system with improved addressing capabilities.

It is another object of the subject invention to provide a mail preparation system with improved capabilities for printing zip code bar code on items to be mailed.

It is still another object of the subject invention to provide a mail preparation system with the ability to print classification pointer codes on components of an item to be mailed which are intended to be returned to the mailer (e.g. payment stubs) to assist in processing of returned mail.

It is still another object of the subject invention to provide mail processing system with improved

BRIEF SUMMARY OF THE INVENTION

The above objects are achieved and the disadvantages of the prior art are overcome in accordance with the subject invention by a system for preparing items to be mailed which includes a data base system for storing records of selected values of parameters for preparing items to be mailed, each of the records including an identification code; apparatus for marking items to be mailed with selected identification code values; apparatus for preparing items to be mailed in accordance with the stored parameters; the preparing apparatus including a detector for detecting and outputting the selected identification code values from the items to be mailed; and a control system responsive to the output identification code values received from the detector for accessing the records stored in the data base system which are associated with the output identification code values and outputting the selected parameter values stored in the accessed records to the preparing apparatus to control preparation of the items to be mailed.

In a preferred embodiment of the subject invention the preparing apparatus includes an inserter system and the parameters stored in the data base include insert

parameters which define the inserts to be assembled with items to be mailed.

In another preferred embodiment of the subject invention the preparing apparatus includes a printer and the records in the data base include parameters defining the address for each item so that the printer may be controlled to print the address on items to be mailed.

In accordance with another aspect of the subject invention control documents for a batch of items to be mailed are prepared by an electronic data processing system which provides an output for controlling a line printer to print the documents. The data processing system further includes a subsystem for receiving the output to the line printer and modifying the output by removing dash code information, substituting an identification code, and outputting the modified information to the line printer. The subsystem also creates and transmits to the data base system a record associated with the identification code which may include information corresponding to the dash code, address information, zip code information, etc.

In still another preferred embodiment of the subject invention, components of an item to be mailed which are intended to be returned to the mailer may be marked with a classification pointer code to assist in processing returned mail.

Thus it may be seen that the subject invention advantageously achieves the above described objects and overcomes the disadvantages of the prior art. The subject invention is particularly advantageous in that the essentially unlimited storage available in a data base system allows a vastly increased amount of information to be associated with each control document. Thus address information, zip code, and classification pointer codes, as well as other information may be stored for each item to be mailed and printed after the item is assembled. It is also particularly advantageous that the stored information may be easily modified by conventional data base management techniques without the need to reprint the control documents. It is a still further advantage of the subject invention that the limited amount of information which need be printed on the control document as an identification code allows the identification code to be used in the form of an error correcting code; greatly reducing the probability of an error in mail preparation.

Other objects and advantages of the subject invention will be apparent to those skilled in the art from consideration of the attached drawing and the detailed description of the preferred embodiments set forth below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a schematic block diagram of a mail preparation system in accordance with the subject invention.

FIG. 2 is a flow chart of the control of a mail preparation system in accordance with the subject invention.

FIG. 3 is a flow chart of a data processing subsystem for modifying the information printed on control documents.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a mail preparation system which includes a control document printing system 2 and an inserter system 4. System 2 comprises a conventional electronic data processing system 10 which controls a conventional line printer 20 to print batches of control

documents such as utility bills, bank statements, etc. in the form of fan fold computer printout 30 in a manner which is well understood by those skilled in the data processing art and which need not be discussed further here for an understanding of the subject invention. Data processing system 10 is also programmed to generate records associated with selected values of identification codes and to print selected values of the identification codes on each control document in the form of dash code; which is preferably printed on the sprocket strips of the fan fold computer printout paper. Each record includes the particular value of the identification code selected, and may include, but is not limited to, dash code information for controlling an inserter, zip code information, classification pointer codes to be printed on components of an item to be mailed which are intended to be returned to the mailer (e.g. business return envelopes), and, where the identification code identifies the control documents uniquely, address information. These records are transmitted to inserter system 4 for use in further preparation of items to be mailed in a manner which will be described further below.

Communications link 40 may be any of a number of well known techniques for the communications of digital data including, but not limited to, electronic communication over telephone lines or over local area networks, or over dedicated communications lines, or may be simply the physical transfer of media such as tape or floppy discs.

Data processing system 10 may be formed by modification of existing data processing system programmed to produce control documents for use in conventional dash code controlled inserter systems by the addition of a post-processor subsystem which intercepts the control signals from system 10 to line printer 20 before they are transmitted and modifies them by removing the dash code and substituting an identification code before retransmitting the modified signals to line printer 20. The post-processor subsystem also generates the appropriate records associated with particular values of the identification codes, as described above, and transmits these to inserter system 4 over communications link 40. Operation of such a post-processor subsystem will be described in more detail below.

Printout 30 is then physically transported to inserter system 4 for further preparation. Printout 30 is separated into discrete control documents by conventional burster 50, which includes conventional scanner 52. Since control documents are physically identical to prior art control documents the separating and scanning operations carried out by burster 50 and scanner 52 are identical to those known in the prior art; except that scanner 52 transmits the identification code information to computer system 60, which controls the operation of inserter 4 in a manner which will be more fully described below. Details of the scanning of dash code are provided in commonly assigned patent application Ser. No. 770,127; to: Lorenzo; filed: Aug. 28, 1985, now U.S. Pat. No. 4,659,939. Computer system 60 comprises processor 62, data base 64, operator interface 66, which may be a conventional keyboard and display, and conventional I/O device 68, which may be a conventional tape drive or floppy disc drive. Computer 60 also communicates with electronic scale 70 to receive information for determining the weights of inserts, as will be further described below. Electronic scales with communications capability such as the model EMS-5 scale marketed by Pitney Bowes Inc. of Stamford, Conn., are

well known and need not be described further here for an understanding of the subject invention.

Computer system 60 receives the identification code information from control document cd and accesses the associated record, preferably randomly, stored in data base 64. System 60 then generates control signals to control inserter 80 and other subsystems as will be described more fully below.

After separation, control document cd is transported through conventional inserter system 80. Inserter system 80 comprises a plurality of insert feed stations 82 and an inserter station 84. At each of stations 82 an insert may be assembled with control document cd in response to control signals from processor 62. Typical inserts would be advertising flyers, business return envelopes, etc. At insert station 84 the components of an item to be mailed are assembled by insertion of the inserts and the control document into an envelope to form item i.

Those skilled in the art will readily recognize that the signals generated by processor 62 for control of inserter 80 may be identical to those generated in the prior art and that accordingly the design and function of inserter 80 may be conventional. This is particularly advantageous since as a result existing mail preparation systems may be combined in accordance with the present teachings with the above described post-processing subsystem and computer system 60 to form the subject invention.

A more detailed description of the operation of conventional inserters and bursters such as inserter 80 and burster 50 is given in U.S. Pat. No.: 4,527,468, to: Piotrosky; for: Apparatus For Separating Multiple Webs Of Documents Into Discrete Documents And Forming The Discrete Documents Into Batches; issued: July 9, 1985.

After insertion item i is transported through conventional printer 90 which operates under the control of processor 62. In one embodiment of the subject invention printer 90 may be a conventional bar code printer which is controlled to print the appropriate zip code in bar code format on item i. In another embodiment printer 90 may be a conventional character printer which is controlled to print the address on item i. And of course, in another embodiment printer 90 may combine character and bar code printing capabilities to print both the address and the zip code.

After printer 90, item i is transported through conventional electronic postage meter 100, such as the model number 6500 marketed by Pitney Bowes Inc. of Stamford, Conn., which is controlled by processor 62 to frank item i with indicia corresponding to the appropriate postage amount. In systems where inserter 80 produces items at a rate faster than that in which meter 100 can be reset a plurality of preset meters may be arranged so that as item i passes through them in sequence the appropriate meter is tripped under the control of processor 62 to properly frank item i. Details of electronic control of postage meters are provided in U.S. Pat. No.: 4,301,507; to: Soderberg et al.; for: Electronic Postage Meter Having Plural Computing Systems; issued: Nov. 17, 1981; which is hereby incorporated by reference.

In another preferred embodiment of the subject invention one or more of insert stations 82 may be modified by the addition of a conventional print mechanism, such as an ink jet printer operating under control of processor 62 to print inserts such as business return envelopes with characterizing pointer codes in machine readable form. Such characterizing pointer codes could

then be scanned when return mail was processed and the characterizing pointer codes scanned from the returned mail used to access a data base to retrieve information to be used to assist in processing the return mail. Details of such a system for processing return mail are given in the commonly assigned U.S. patent application Ser. No. 025,304 filed on even date herewith; to: Durst et al.; for: Letter Processing Apparatus.

FIG. 2 shows a flow chart of the operation of computer system 60. To initialize the system an operator first places a known number of inserts to be inserted in items to be mailed by inserter 80 on scale 70 and issues a start up command through operator interface 66. At 200 processor 62 will set all values for the weight of inserts to zero. At 202 the operator enters the number of inserts on scale 70 and the particular insert station 82 for which they are intended. At 204 processor 62 receives the total weight of the inserts from scale 70. At 206 processor 62 computes the weight of the inserts and sets the insert weight for the identified station equal to that weight. At 208 processor 62 tests to determine if that was the last insert to be weighed. If not it returns to 202 to determine the next insert weight. If it is the last insert weight the operator enters additional set-up information such as class of service or known insert weights, if necessary, and at 210 processor 62 exits. Preferably the weight of the inserts is computed by determining the average weight and adding corrections for the error of scale 70 and variance in the insert weight to assure that no insert weighs more than the computed weight.

At sometime prior to further preparation of the items to be mailed data processing system 10 will transmit records for the items to be mailed to processor 62 over communications link 40. Using well known conventional data base management techniques processor 62 will store these records in data base 64.

As the next step in preparation of the items to be mailed printout 30 will be delivered to inserter system 4. Once the operator has properly attached printout 30 to burster 50 he may enter a start command through interface 66 and at 220 processor 62 waits for the first identification code to be transmitted by scanner 52. At 222 processor 62 fetches the record corresponding to the received identification code. At 224 processor 62 computes the total weight for the item to be mailed using the weights determined in the above described initialization routine and the dash code information defining which inserts are to be assembled in that item. At 226 the processor accesses an appropriate previously stored postal rate chart to determine the appropriate postage amount in accordance with the weight of the item to be mailed. At 228 processor 62 outputs dash code information to inserter 80 to control assembly of the item to be mailed. At 230 processor 62 controls print mechanism 86 to print a machine readable classification pointer code, determined from the record fetched at 222, on an insert such as a business return envelope to be inserted in the item to be mailed. At 232 processor 62 controls printer 90 to print address information determined from the record fetched at 222 on the item to be mailed. Similarly, at 234 processor 62 controls printer 90 to print zip code information in bar code form on the item to be mailed. At 236 processor 62 sets meter 100 to the postage amount determined at 224; or alternatively, selects the appropriate one of a plurality of preset meters. At 238 processor 62 tests 70 determine if that was the last item to be mailed. If not, it returns to 222, and if so it exits.

In another embodiment of the subject invention the identification codes need not define a randomly accessible record but need only define the sequence of control documents cd. Corresponding records would be stored in data base 64 in the same order and accessed sequentially. Upon detection of an out of sequence control document cd system 60 would halt and alert an operator to correct the error condition. Preferably, this technique (hereinafter referred to as sequential matching of control documents cd and associated records) is implemented with identification codes which are cyclically sequential, that is repeated after a preselected modulus. The modulus is selected large enough so that it is unlikely that an entire cycle of control documents cd could be displaced without detection, yet small enough to minimize the number of bits which need be printed on control documents for large runs of items.

In still another embodiment of the subject invention, the identification code information printed on control documents cd may include error detection or correction code, such as Hamming code, allowing detection or correction of errors in scanning of such identification code information. Hamming code and other techniques for detection or correction of errors in received information are well known and need not be described further here for an understanding of the subject invention.

In a preferred embodiment of the subject invention records for items to be mailed stored in data base 64 may be updated using well known conventional data base management techniques using either update information transmitted from data processing system 10 or input through I/O devices 66 and/or 68.

Those skilled in the art will readily recognize that for convenience of description the above descriptions have been given in terms of a single item to be mailed transported through inserter system 4. However, it is preferable, and easily within the skill of the person of ordinary skill in the art, to operate inserter system 4 in an interleaved fashion so that a sequence of items to be mailed is operated on concurrently at the various stations of inserter system 4.

FIG. 3 shows a flow chart of the above described post-processing subsystem which may be incorporated in existing data processing systems for the generation of control documents with minimal software changes. For example, the subsystem shown might easily be incorporated in an existing system by replacing a call to a subsystem which formatted and outputted information for printing on a control document with a call to the subsystem shown. When the subsystem shown is called at 300 it would receive the data to be printed on the control document. At 302 it would determine the dash code information as well as address and zip code information and at 304 would create a record including the dash code information, address information, zip code information and classification pointer code information, then assign an identification code to the record. Classification pointer codes can be determined from a pre-established look-up table based on, for example, account numbers, or may even be simply account numbers. At 306 a record is transmitted to processor 62. At 308 the dash codes are stripped from the print information and replaced with the identification code, which, as noted, is to be printed in dash code format. In cases where the control document or a portion of the control document comprises a component which is intended to be returned to the mailer, at 310 the classification pointer code may be added to the print information for printing

on the control document. It should be noted in these cases some slight modification of the formatting of the control document may be necessary. At 312 the original subsystem for formatting and output of the print information is called. And at 314 the original subsystem returns and at 316 the subsystem shown returns.

(In other embodiments of the subject invention functions may have different sequences. For example record transmission, formatting, or printing may be performed for an entire batch of control documents after they are modified; instead of on a document by document basis as shown in FIG. 3.)

The embodiments described above and illustrated in the attached drawings have been given by way of example and illustration only. From the teachings of the present application those skilled in the art will readily recognize numerous other embodiments in accordance with the subject invention. Accordingly, limitations on the subject invention are to be found only in the claims set forth below.

DEFINITIONS

As used herein the following terms shall be defined as follows:

Control document—A document which is included in each item to be mailed prepared by an inserter system and which includes information scannable by the inserter system to determine the contents of the associated item. Control may be direct (as in the prior art) or indirect by accessing a pre-established data base (as in the subject invention).

Identification code—A code included on each control document in accordance with the subject invention, the particular value of the identification code associating a control document with a record in a pre-established data base containing information for processing items to be mailed.

Classification pointer code—A code included on items of return mail (e.g. return envelopes), the particular value of the classification pointer code associating an item of return mail with a record in a pre-established data base containing information for processing return mail.

What is claimed is:

1. A system for preparing items to be mailed comprising:
 - (a) means for maintaining a data base, said data base comprising a plurality of records each of which includes selected values of parameters for preparing one of said items, each of said records including an identification code having values selected for identifying an addressee;
 - (b) means for marking each of said items with the selected values of one of said identification codes;
 - (c) means for preparing said items to be mailed in accordance with said parameters, said preparing means including means for detecting and outputting said selected identification code values from said items; and,
 - (d) means responsive to each of said output identification code values for;
 - (d1) accessing one of said records in accordance with said output identification code values included therein; and,
 - (d2) outputting said selected parameter values from said one of said accessed records to said preparing means.

2. A system as described in claim 1 wherein said preparing means further comprises an inserter system and said parameters further comprise insert parameters defining inserts to be assembled with said items.

3. A system as described in claim 2 wherein said preparing means further comprises means for printing addresses and said parameters further comprise address parameters defining address information.

4. A system as described in claim 2 wherein said preparing means further comprises bar code printing means for printing zip codes in bar code format and said parameters further comprise zip code parameters defining zip code information.

5. A system as described in claim 2 wherein said system further comprises means for computing the appropriate postage amount for said items, said preparing means further comprises means for franking said items, said computing means controlling said franking means to frank said items with indicia corresponding to said appropriate postage amount.

6. A system as described in claim 5 further comprising means for determining the weights of components of said items and wherein said computing means determines the weight of said items as a function of the inserts assembled with said items as defined by said insert parameters and computes said appropriate postage amount as a function of said computed weight.

7. A system as described in claim 2 wherein said preparing means further comprises third print means for printing classification pointer codes on at least one of said inserts or on carriers for said items, and said parameters further comprise classification parameters defining classification pointer code information.

8. A system as described in claim 1 wherein said preparing means further comprises means for printing addresses and said parameters further comprise address parameters defining address information.

9. A system as described in claim 1 wherein said preparing means further comprises second print means for printing zip code information in bar code format and said parameters further comprise zip code parameters defining zip code information.

10. A system as described in claim 1 wherein said system further comprises means for computing appropriate postage amounts for said items, and said preparing means further comprises franking means for franking said items, said computing means controlling said franking means to frank said items with indicia corresponding to said appropriate postage amounts.

11. A system as described in claim 1 further comprising means for updating said data base.

12. A system as described in claim 1 wherein said identification code includes error detection or correction information, whereby said responsive means may further detect or correct errors in said output identification code values.

13. In a system of the type comprising a printer and an electronic data processing system for controlling said printer, said electronic data processing system controlling said printer to print control documents with selected information, said selected information including dash code for controlling further processing of an item to be mailed, said item comprising said control document, the improvement which comprises a post-processing subsystem for substituting identification code for said dash code on said control document, generating a record comprising said dash code information and said identification code, and outputting said record.

14. A system as described in claim 13 further comprising:

(a) means for maintaining a data base, said data base comprising records of selected values of parameters for preparing said items, each of said records including said identification code;

(b) means for preparing said items in accordance with said parameters, said preparing means including means for detecting and outputting identification code value from said items; and

(c) means responsive to said output identification code values for:

(c1) accessing each of said records in accordance with said output identification code values; and

(c2) outputting said selected values in said accessed records to said preparing means.

15. In a system as described in claim 13 the further improvement comprising means for printing classification pointer codes on portions of said control documents intended to be returned to the mailer of said items comprising said control documents.

16. A method for controlling an apparatus for preparing items to be mailed in accordance with parameters, comprising the steps of:

(a) maintaining a data base, said data base comprising a plurality of records each of which includes selected values of said parameters for preparing one of said items, each of said records including an identification code having values selected for identifying an addressee of a given item;

(b) accessing said data base in accordance with the selected values of each of said identification codes scanned from at least one component of each of said items; and

(c) outputting said selected values of parameters included with each of said selected identification code values from said accessed records to said preparing apparatus for preparing respective items to be mailed.

17. A method for preparing items to be mailed comprising the steps of:

(a) maintaining a data base, said data base comprising records of selected values of parameters for preparing said items, each of said records including an identification code;

(b) marking said items with selected values of said identification code;

(c) scanning said selected identification code values from said items;

(d) accessing said records in accordance with said scanned identification code values;

(e) outputting said selected values of said parameters to control apparatus for preparing said items to be mailed in accordance with said parameters.

18. A system for preparing items to be mailed comprising:

(a) means for maintaining a database, said data base comprising sequential records of selected values of parameters for preparing said items;

(b) means for marking said items with sequential values of an identification code corresponding to said sequence of records;

(c) means for preparing said items to be mailed in accordance with said parameters, said preparing means including means for detecting and outputting said selected identification code values from said items; and,

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- (d) means responsive to said output identification code values for:
- (d1) sequentially matching said records and said items in accordance with said output identification code values;
 - (d2) outputting said selected parameter values from said accessed records to said preparing mean; and
 - (d3) halting preparation of said items and entering

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an error routine to alert an operator in response to detection of an out of sequence item.

19. A system as described in claim 18 wherein said sequential values of said identification code are cyclic with a cycle having a preselected modules less than the number of said items.

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